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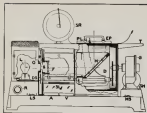


Fig. 1

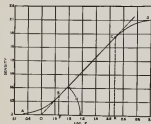


Fig. 4

Editor's Note: This is the first in a series of articles by Emory Hale, A.S.C., on Sensitometric Control. The series will comprise four installments. In the August issue Mr. Hale will deal with contrast as distinguished from gamma and also give general methods of negative development.

IT IS the purpose of this paper to present a resume of the current methods involved in the application of sensitometry to motion picture film processing today in the major laboratories in Hollywood, California. During the past decade very rapid progress has been made in the general technique of the handling of motion picture film of all kinds in a variety of processes. This paper, however, will discuss only that phase of the handling which deals with the actual chemical development processes.

Ten years ago the development of motion picture film in Hollywood was entirely a manual operation being accomplished with the aid of the well-known rack and tank system. During the last ten years much work has been done and many papers written on the general subject of machine development of motion picture film, with the result that at the present time, with the exception of one or two smaller laboratories, all film developed in Hollywood is handled by machines. With machine development one can feel assured that the actual conditions under which film is developed are much more stable than those conditions which existed under the now almost obsolete rack and tank methods. In discussing sensitometric control in the motion picture laboratories in Hollywood, therefore, it must be remembered that such laboratories as Paramount, Metro, Fox, Warners, Consolidated, Hanley, etc., use developing machines oper-

Sensitometric

ated at speeds in the neighborhood of 90 feet per minute.

Prior to the actual use of the classical Hurter and Driffield method of sensitometry in motion picture practice, certain less accurate control methods were in use. However, until recently no precise sensitometric control instruments were available. All control was accomplished by visual judgment of the operator in actual charge of the development processes. By the rack and tank method of development densities were matched and picture quality was obtained solely as a result of visual comparison. Naturally a procedure of control which is dependent upon personal judgment lent for no standardization of results. It was possible to establish a procedure such as specifying a certain number of shakes to the rack at certain stated intervals of time during development, but the developing solutions were not taken care of from the replenisher standpoint with anywhere near the precision which now takes place with machine development and the accompanying circulating and conditioning systems.

Hurter and Driffield Sensitometry

The first thing to be considered in discussing the Hurter and Driffield system of sensitometry is the instrument with which a series of exposures can be impressed upon a piece of film under known conditions of light quality, light intensity, and exposure time. It can be readily seen that an ordinary picture does not allow for a complete technical analysis. It is not possible to determine the absolute brightness which cause each of the different densities in the negative and although the time of exposure given in a camera is fairly well established it is still impossible to obtain a correct technical estimate of the total value of exposure as expressed by the simple equation $E = It$. In a mechanical instrument designed for impressing uniform exposures one is not confronted with a series of densities which are distributed heterogeneously throughout the film. With the aid of a properly designed instrument it is possible to obtain a series of uniformly exposed areas differing as a result of a known ratio of exposures. A strip of film containing a series of uniform areas of density gives a means by which certain technical analyses may be made of both the film and the developer. The first problem, therefore, to be considered in setting up a sensitometric control is the establishment of this exposure instrument, which is called a sensitometer, and it must be able to make exposures which can be definitely repeated. From the standpoint of a sensitometer the Eastman Kodak Company built and placed on the market for general sale about two years ago an instrument which is called the Eastman Type 11b sensitometer. This instrument operates on the time scale principle and makes use of precisely calibrated tungsten lamps as the light source. This instrument has been adequately described by L. A. Jones (1) who designed and supervised the building of the instrument.

The Eastman Type 11b sensitometer was designed especially to meet the need of the modern motion picture film laboratory. It provides a precise and rapid means of making routine sensitometric tests for the control of development processes. Figure 1 shows a partial vertical section through the optical axis of the sensitometer. This instrument in-

Control in the Processing of Motion Picture Film

by

Emery Huse, A. S. C.

presses on the film under test an accurately predetermined scale of exposures which may be maintained constant from test to test over long periods of time. The exposure scale consists of 21 steps produced by exposures equal in illumination and ranging from 1 to 1024 in relative times, each exposure being 1/414 (square root of 21) times as long as the next shorter. This constant fractional difference between steps permits the density readings to be spaced at equal intervals along the log exposure axis in constructing an H and D (density-log E) curve. Figure 2 shows an actual sensitometric record made with this instrument.

Tables 1 and 2 herewith submitted show the actual setup of the instrument for the exposure of positive and negative films respectively.

TABLE 1

Positive Setup

Lamp	72 watt 8 volt incandescent headlight calibrated for 2000K
Filter	18 B correcting to 3000K
Intensity	27 meter-candles
Time	4.95 seconds at 50 cycles
log E max	2.15

TABLE 2

Negative Setup

Lamp	55 watt 8 volt incandescent headlight calibrated for 2500K
Filter	79 correcting to 5400K
Intensity	75 meter-candles
Time	4.95 seconds at 50 cycles
log E max	0.57

It is with this instrument that practically all sensitometric control in the processing of motion picture film in Hollywood is accomplished. At the time of this writing there are nine of these instruments in use there. It is interesting to note at this point that at the Annual Awards Banquet of the Academy of Motion Picture Arts and Sciences in November, 1932, this instrument was given official recognition by being awarded an honorable mention by the committee on awards on Scientific and Technical Achievements.

After the development of the sensitometric strip made on the Type 11B sensitometer it is necessary, in order to attain the desired technical results, to find a means of measuring the densities of the various deposits. A photometric instrument of one type or another is used for this work. Such an instrument in common use in most of the

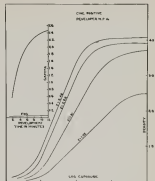


Fig. 2

laboratories in Hollywood is the Eastman densitometer which has been described by Capstaff and Purdy (2). At the present time there are approximately 25 of these instruments in use in Hollywood, both in laboratories and in sound departments. Some of these departments make use of polarization photometers such as those made by Schmidt and Haensch or by the Bausch and Lomb Optical Company.

The Eastman densitometer, which is shown in Figure 3, is designed to fulfil several conditions, namely: the ability to read densities from 0.00 to 3.00, to measure very small areas (1/4 sq. mm.) utilizing the same source of light for the illumination of the density to be measured and furnishing the light for the comparison beam, calibrated to read direct diffused density, and designed to be portable, compact and inexpensive. It has been shown in actual practice that this instrument fulfils these requirements.

The West Coast Laboratory of the Eastman Kodak Company maintains a continual service in checking the densitometers in the field for their physical condition as well as their photometric ability, calibrations being made against standard densities originally calibrated in the Research Laboratories in Rochester.

Inasmuch as the actual conditions of exposure of the sensitometric strip are known, i.e., the time of exposure and the intensity and quality of the exposing radiation, it is possible with the values of density available to construct the characteristic density-log E curve. As the exposure increases so the density increases until upon completion of the plotting of the curve a graph, such as is shown in Figure 4 is obtained. There are three distinct portions to this curve, namely: the toe, which is that portion indicated between A and B, the straight line, between B and C, and the shoulder, between C and D. It is quite well known that these three portions of the characteristic curve are referred to respectively as the regions of under exposure, correct exposure, and over exposure. It is of value, therefore, in the application of sensitometry to motion picture film processing to know the characteristic curve resulting from the development of sensitometric exposures in the negative, positive,

*West Coast Manager, Motion Picture Film Division, Eastman Kodak Company.

Continued on next page

Continued from preceding page
and sound track developing solutions. Quite naturally the negative developer is studied in terms of exposures made on negative film, the positive developer in terms of exposures made on positive film, etc.

Gamma

There are in the Hurter and Driffield system of sensometry several constants regarding which data is desired. From the standpoint of motion picture control, by far the most important characteristic is the slope of the straight line portion of the curve, which is commonly referred to as "gamma." Gamma is defined as the tangent of the angle formed by the straight line portion of the H and D curve and the log E axis, and is an indication of the degree of development. It is, of course, a constant of the emulsion itself but for a given emulsion developed in a given solution gamma is a numerical specification of the degree of development in that solution. It is important, furthermore, to know that as development time increases gamma increases, meaning that the straight line portion of the curve forms increasingly greater angles with the log E axis as development time progresses. This is an extremely important fact.

Probably the best way to determine for a given emulsion the reaction which a developing solution will give is by study of the rate at which gamma builds up with development time. Figure 5 shows a series of H and D curves, all of which had identical exposures in an Eastman Type 11b sensitometer, but

other sensometric constants which while important, both from a technical and practical standpoint, do not necessarily occupy the same important niche as that filled by gamma. Reference is made to the constants speed, latitude, and fog.

Speed

Speed as a sensometric constant has been subjected to many interpretations. From the standpoint of the practical photographer, speed and density mean much the same thing for the reason that if two samples of film are exposed simultaneously to the same quantity and quality of light and then developed for the same time, that sample showing the greatest density is considered the fastest. From the standpoint of the Hurter and Driffield method of sensometry, speed has a little different meaning and it is arbitrarily defined as the reciprocal of the inertia multiplied by a constant, i.e.,

$$S = \frac{1}{I} \times k$$

The inertia "I" is defined as the exposure value at the point where on the log E the straight line portion of the H and D curve extended cuts that axis. The value of the constant "k" should be so chosen that it is sufficiently large so that values of speed for various commercial emulsions are of convenient magnitude for practical use. Speed determinations made by this method on the Eastman Type 11b sensitometer make use of the value 10 as the constant k. Speeds as thus determined are not of any particular value to the practical laboratory man. This method of speed determination has been discussed because it is technically important and furthermore it was desirable to acquaint the reader with the fact that this constant exists.

Latitude

Latitude is a constant which has to do with the range of brightnesses which can be adequately rendered by a photographic emulsion. The numerical specification of latitude

Continued on Page 113

Fig. 2

each strip of which received a different time of development under a constant developing condition. After the determination of gamma for each of these curves, these values are plotted as ordinates against the time of development as the abscissa. A new curve is thus obtained which definitely shows the relationship existing between gamma and development time and this curve is referred to as the time-gamma curve. From the sensometric standpoint this curve tells a great deal about the condition, or rather the reaction, of that developer to that particular type of film. It is now very easy to see that regardless of whether negative or positive film is to be developed, the determination of a time-gamma curve for negative film in the negative solution and for positive film in the positive solution is very essential. In actual practice complete series of H and D curves for a variety of development times are not obtained because with practice it is readily determined what the probable range of development times will be and it is therefore only necessary to construct time-gamma curves over the range which is within that used practically. There are several



Fig. 3

Vibration Gives Us Greatest Worry

As told by
Harry Perry, A.S.C.
to Karl Halle

Editor's Note: Harry Perry has contributed photography to practically every feature in our field that has received the serious Wings, Best's Angels and many others have given the admittance of the world photography contributed by him.

VIBRATION is the bugaboo of the cameraman in the air. It has taught us to anchor our equipment solidly. Temporary fastening will not do.

We not only have vibration to contend with, but also the back wash of the propeller when we are not shooting from a cabin job. But, still, we have more respect for vibration than any other factor in photographing from the air.

We not only watch our contrivances on the camera itself, but always keep a weather eye open to the fastening of the camera. They'll work loose sometimes for some unknown reason. An incident like this happened to me. I observed that the camera was listing—not much, but still listing, and there was a more noticeable vibration. I immediately looked to the fastening and found that one of the bolts was working loose. The assistant cameraman had to take the place of the bolt for the rest of the trip. He had to hang on with all of his strength to keep that camera solid. The wind pressure was tremendous, we were also hitting lumpy air pockets.

One time we hit an air pocket that sent me to the full length of my six-foot safety belt—that airplane dropped right out from under me, but fortunately my camera kept on grinding. My return to the cockpit could hardly be called graceful—but it certainly was in accordance with the best laws of gravity. I mention this to show the great importance of secure anchoring of the camera at all times.

And another vital thing is to be sure that all detachable parts are wired or taped securely. Once I had set the automatic camera on the running gear of the plane, and so arranged the control that the pilot could push the starting button. When he came back to the field he had several hundred feet of negative trailing back of his plane. The powerful back-wash from the propeller and the vibration had worked the magazine cover off, also succeeded in loosening the take-up reel, with the obvious result, a trail of ribbon flying back of the plane that might have been a fine piece of decoration for a honeymooner's auto.

It is these experiences that have taught the cinematographers of the air some of the technical things they are up against. The shooting of pictures in most instances is hazardous enough without attempting to take chances with equipment—those things must be perfect—they must be so that they can be operated with the least difficulty at all times. Some of us have developed our own filter adapters—they are important tools up in the air. The sky changes, conditions change and we have to make rapid changes of filters as we are flying. We cannot start out with a certain filter and feel it is going to meet all requirements. The blueness of the sky is a thing that we must read at a glance. If it is the soft blue that comes out well, of course we use the lighter filter—possibly a K or a C or Aero Filter—but if it is a washed out or a steely blue we must go into the heavier reds—and these conditions are changing rapidly—in fact, so rapidly sometimes that it is absolutely essential that we can make a rapid change of filters before the scene leaves us at the high rate of speed the plane usually travels.

The air photographer has learned many things that the man working on the ground does not have to contend with. We must be sure that the exhaust of the motor is not sweeping across our lens, or it will give us a fog effect. Flies have been known to get into the lens hood and spoil a shot—I have known this to happen twice in succession. Once in the hood the high wind pressure will not let them get out.

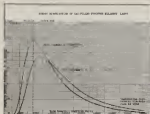
I have found vibration so bad when shooting colored pictures, where more than one piece of film is in the aperture at one time, as to work this film away from registered position and lose the loop entirely, buckling the film.

The aerial cinematographer prefers the cabin planes for shooting. It eliminates that terrible wind blast from the propeller. He prefers to have the door taken off, when the plane owner will permit. This gives more freedom of action. But when using an open plane he must take what the propeller delivers to him. To overcome this, a windshield was built for the cinematographer on one occasion, only to find that it interfered with the force of the propeller wind back to the tail of the ship and that the ship could not be steered, as it was not getting sufficient wind to affect the rudder.

However, a very important thing is to have a pilot who understands pictures—one who can keep the objective in sight—one who can interpret angles.

Harry Perry, A.S.C. ready for a flight among the clouds to photograph screen thrills.





Super-Photofloods For the Studio

by

William Stull, A. S. C.

Member of Research Committee,
American Society of Cinematographers

FOLLOWING in the footsteps of the well-known 'Photoflood' bulbs announced a few months ago for non-professional photographic use, the General Electric Company has brought forth a similar type of globe in larger units for studio use known as the 'Super-Photoflood.' Although produced especially to meet the requirements of modern natural-color cinematography, the new lamps should be at least equally useful in the more common field of black-and-white camera work, since they offer a more intense, whiter light with a very marked reduction of infra-red (heat) radiation.

The principle of the photoflood is probably too well known to require additional exposition here, especially since many cinematographers already employ the smaller photofloods in 'Baby Spots' and in 'practical' set light-fixtures. Suffice it to say that they are high-efficiency bulbs designed to operate with great intensity on currents considerably in excess of their rated voltage, giving an intense white light. It is well known that if the voltage applied to a lamp is increased, the light-output increases at a much faster rate than either voltage or wattage, while the amount of blue-violet radiation increases faster than does the red-orange. A 10% increase in voltage, for instance, will give a 16% increase in wattage, but a 40% increase in light output. In the case of the small photoflood lamp, rated at 65 volts but normally operated at from 110-115 volts, an 80% increase in volts increases the wattage two and one-half times, but raises the light volume **five and one-half times**. The new Super-photofloods, when compared to standard types now in general use in the studios, are found to give an increase of 270% in the violet region (4500-4500 Angstrom) but only 55% increase in the red (6300-7000 Angstrom). Based on an equal red radiation for the two

lamps, the increase in the violet is 140%. The overall increase in intensity is approximately 100%. Used in a standard studio unit—the Mole-Richardson 'Rifle' type, which concentrates 59% of the light within a 60-degree angle—we find that whereas a standard 1500-watt P5-S2 type bulb directs 17,200 lumens in the sixty-degree useful angle, the new 2000-watt P5-S2 (Super-Photoflood) gives 34,400 lumens in the same angle, an increase of exactly 100%.

There is, however, the familiar drawback to all photoflood lamps—shorter life. The smaller photofloods, as is well known, have an average life of between two and three hours at full intensity. This life is materially increased in many installations, however, by the use of shunt circuits which permit the operator to burn the lamp at a reduced voltage while lining up, and then to switch to full voltage and intensity for actual photographing. The same expedient is recommended for conserving the larger photofloods, which normally have a life of from 15 to 18 hours at full intensity. It is entirely feasible to reduce the line voltage to approximately 90 volts, by means of either a field control at the generator, or by the use of grids outside of the set, keeping this voltage while preparing, and operating the lamps at full voltage only when actually shooting. With all of the lamps operating at a uniformly-reduced voltage during the preparatory work, lighting balances, contrasts, shadows, etc., should not be altered when the lamps are brought up to full voltage, while the life of the bulbs would be materially increased. As these bulbs darken quickly, a cleaning-powder is provided in the globes, and they should be cleaned after every five or six hours of full-intensity operation.

These new lamps will take care of the floor-lighting units, but how about the larger units used overhead? It has been found unnecessary to develop new bulbs for these, since the already available 5 kw. and 10 kw. types are already designed for extreme efficiency. It is necessary only to use the bulbs of this size rated for 105 volts on 120-volt circuits to get the desired effect.

Of course, when some new development such as this is announced, the inevitable question in the minds of its prospective users is, 'Very nice—but what will it actually do?' To answer this, we must examine the relationship between existing lamps and the Super-Sensitive film now in general use. Essentially—despite all of the recent progress in pan-chromatization—we have a film, highly sensitive at the blue-violet end of the spectrum, and somewhat less sensitive toward the red-orange end. With normal Mazda lamps, we have a light having its greatest radiation in the orange-red and beyond, but tapering down toward the blue-violet end of the spectrum—a very fortuitous combination. More than a few of the outstanding masters of the camera, however, have found that the best results are obtained by using a very light bluish silk over their lights, passing the blue-violet and green components freely, but slightly curtailing the yellow, orange and red frequencies. The photoflood bulb, though not making so great a correction, follows this lead to a certain degree, as its radiation is markedly increased in the blue-violet region, and decreased in the orange-red. It is, in fact, a much closer approximation of sunlight than has hitherto been achieved in clear-glass Mazda bulbs. The Super-photoflood should, therefore, give a decidedly marked improvement in quality—in the pleasing rendition of tone and texture. This has already been acknowledged by many cinematographers in their practice of using the smaller photofloods in baby spots and practical set lighting-fixtures.

Continued on Page 114

Special Effect Use of Filters

Part II

by

Hartley Harrison

Editor's Note: This is the second in the series of articles on filters by Hartley Harrison, well-known manufacturer of color and effect filters.

IN THE previous article we discussed three rules of filters, namely: That a colored filter is only selective when there is color for it to select from; that a colored filter only changes the exposure of objects that are of a different color than that of the filter, and that a color filter does not change the exposure of objects which are the same color as the filter.

Keeping the fact in mind that all panchromatic films are more blue sensitive than it is red sensitive, and that it is more red sensitive than it is green sensitive, let's apply these filter rules to special effect use.

One of the most common special effect uses of filters is making an ordinary day scene look like a night scene, so we will draw our word picture around that type of application.

In making this type of scene we have a choice of two kinds of effects, a contrasty, under-exposed moonlight scene and a flat under-exposed night scene, with the objects just visible and no detail even in the highlights. Of the two the last one is probably the most difficult, as the greatest contrast is always obtained with an under-exposure, and this contrast must be reduced in the flat night scenes. Of course, the subject and conditions determine the type of filter to use in throwing the scene out of the balance that is seen visually, so we will of necessity explain the conditions and subjects and apply various filters to them.

Let's take the making of flat night scenes for our illustration, and suppose we have a blue sky with large white clouds and the sun reflected from off of a white house with light gray sidewalks, what shrubbery there is being gray with dust and fairly high surface reflection. Our blue sky would then have the least amount of light and we would want to reduce the exposure of the house, etc., to that of the sky. We would, therefore, pick a filter that would not change the exposure of the sky, and according to our third rule, a blue filter would not change the exposure of blue light, therefore we would use a blue filter. Now our second rule says that a filter will change the exposure of objects that are not of the same color as that of the filter, the white house being composed of reflecting green and red as well as blue, the blue filter would hold back the exposure of practically everything except the blue sky and tend to reduce all of the scene to a common gray relation on the film, which is just the thing we are striving

for. The bluer the sky is, the greater the difference we can make up to the point where, when we use a monochromatic blue filter, that is, one that will allow only blue to pass through and stop all of the red and green, and we have a pure blue sky we have reached the saturation point of color and from thereon we have no control over differences of amounts of light coming from different objects as far as colored filters are concerned.

Now, let's change our subject to a blue sky and an autumn foreground with brown trees, dark yellow grass, etc. and our greatest illumination coming from our sky. Now, obviously to hold back the sky to as near a balance as the foreground, we would use a yellow filter because browns are very dark yellows. Of course, yellow being red and green and the shade of yellow depending upon amount of red to the amount of green, and if we reduce our foreground to primary colors we have a red and green foreground with the red predominating if it's a reddish brown, therefore our filter should be a reddish yellow filter like a K2 or a G, or as we go heavier, a combination 23A red and 6 green, or still heavier, a 72 gamma, all of which are red and green combinations, with the red predominating. Now, going back to our foreground, which is red and green, we use a red and green filter, but in trying to handle two colors, we lose some exposure in our foreground, although we also gain in effectiveness against our blue sky, so let us apply our rule by first putting on a red filter and then a green filter instead of both at the same time. When we add the red filter we allow all of the red in the brown to pass through the red filter, but at the same time we stop some of the green, depending on how much green there is in the brown and how heavy the red is. Now we add our green filter which allows all of the green to pass through that is not stopped by the red, but the green stops some of the red, although we have a predominating red-green combination, but at that we have lost some of our foreground exposure. Now let us see how we have affected our blue sky. When we added the red filter we stopped the major part of our blue, and when we added the green we stopped the balance, so that a comparatively small

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No filter used for top illustration. Bottom illustration gives filter used to secure a flat effect in night scene. For contrast in a night scene a red filter would be used.





PHOTOGRAPHY

of the MONTH

THE past thirty days have seen the release of more products of outstanding photographic calibre than any similar period in a long time. Half a dozen or more of the outstanding members of the American Society of Cinematographers have displayed examples of their best work, as though vying for premiere honors, and although the films are intensely varied in type and style, each is a memorable example of the highest type of cinematography. No student of cinematography should miss seeing any of these.

"PILGRIMAGE"

A Fox Production

photographed by **George Schneiderman, A.S.C.**

This is far and away the best opportunity that has come the way of Cinematographer Schneiderman in many years. He has made it an unusually beautiful photograph, and Director John Ford has done his work with more than a little consideration of the pictorial element. The early sequences, especially, are notable examples of composition and lighting, and in them Mr. Schneiderman has achieved some remarkable suggestions of natural depth, in all probability some of these scenes are as close to truly three-dimensional photography as can ever be attained with a single-lens system. "Pilgrimage" was made throughout with standard lens and lighting equipment, so this achievement is due solely to Cinematographer Schneiderman's mastery of lenses and perspective lighting. "Pilgrimage" is decidedly a picture well worth study—and excellent entertainment, to boot.

"THE STORY OF TEMPLE DRAKE"

A Paramount Production

photographed by **Karl Struss, A.S.C.**

A morbid psychological study, "The Story of Temple Drake" is hardly more entertaining than is a beautifully photographed film of a major operation, yet it is in many ways a highly commendable production. It is marked by superb direction and a magnificent performance by Miriam Hopkins—but most important of all, it is, throughout, Karl Struss at his brilliant best. The action covers a wide variety of settings and moods, but through it all, Struss manages to maintain the necessary ominous note in his photography, playing, as it were, a visual prelude like a Wagnerian overture, subtly paving the way for what is to follow. Midway through the picture are some exceptional sequences of effect-lightings which merit careful attention from every student of cinematography, amateur or professional. The amateur, especially, will be interested in some of these lightings, as they reveal the potentialities of Super-Sensitive film and extreme low-key lightings, as well as the effectiveness of single-source lightings made with unusually small units. One scene, for example, is played with a match and a cigarette

for the sole light-source, while several others were made with a single 500-watt bulb.

Aside from these technical considerations, however, "The Story of Temple Drake" offers a vast deal of information as an outstanding example of the fine art of cinematography. By all means see it—but don't expect light entertainment!

"THE WHITE SISTER"

A Metro-Goldwyn-Mayer Production

photographed by **William Daniels, A.S.C.**

To this reviewer's mind, at any rate, "The White Sister" is an achievement entirely to be credited to Cinematographer Daniels, for his superb camera work alone bolsters up an outmoded and ailing story and a deal of uncertain acting. His photography is unfailingly beautiful, and carries exactly the right amount of solemnity to suit the tragic, sentimental story. His treatment of the players is excellent, showing them to excellent advantage, his lightings are all up to his usual high standard. The compositions are often noteworthy, and several of the transitions are most effective, especially the one from Clark Gable's burning airplane to the fireplace before which Helen Hayes is unpacking her lover's effects. Director Fleming—an ex-cinematographer—was very wise in his use of the moving-camera technique, and of other visual directorial tricks. "The White Sister," however, is far more than a few of the lay critics have already observed: primarily "Bill" Daniels' picture.

"THUNDER OVER MEXICO"

Directed by Sergei Eisenstein and released by Sol Leiser

photographed by **Edvard Tisse.**

Emaculated by the regrettable embargo which prevented Mr. Eisenstein from personally cutting this production, "Thunder Over Mexico" (originally known as "Que Viva Mexico") is more Tisse than Eisenstein. Although unskilled hands in the cutting room did away with most of the originality that is expected of Eisenstein, nothing could destroy it—though an Eisenstein picture is not truly Eisenstein's without Eisenstein's highly individual editorial technique—it is not without its merits, for as I have said before, while the world acknowledges Eisenstein as a master director, it has paid all too little tribute to the photographic ability of his Scandinavian co-worker, Edvard Tisse.

"Thunder Over Mexico" is, therefore, largely the triumph of M. Tisse. It is the first time that he has enjoyed the tremendous advantage of really good film and laboratory work—and the results that he has achieved should give him unquestioned rank as one of the great cinematographers of the world. He had little to work with in "Thunder Over Mexico"—no sets, no interior scenes, no artificial lighting equipment, none of the many aids to exterior cinematography enjoyed by his American confreres, just an old delme cam-

era, hand-cranked, perforic; a few crude reflectors, some filters, a few hundred thousand feet of Dufont negative, a first-class American laboratory, and one of the few living directors who really understand the visual foundation of the cinema. With these ingredients, Tisse has achieved one of the most superbly beautiful examples of exterior cinematography ever made. He presents to American audiences the first intimation of the real beauties of our southern neighbor, Mexico; the grandeur of the ancient Maya and Aztec ruins of Yucatan, the deserts and mountains of the North, the pastoral beauty of the vast maguey plantations, and the hitherto unrevealed soul and form of the Mexican people.

It is a noteworthy achievement. Though audiences may be disappointed at the film's lack of the Eisenstein technique (there are none the less a few in Hollywood who could have cut the film understandingly) they will surely end by paying a well-deserved tribute to that great artist, Cinematographer Edvard Tisse.

"WHEN LADIES MEET"

A Metro-Goldwyn-Mayer Production

photographed by Ray June, A.S.C.

From the reviewer's point of view, the easiest thing to do about this picture would be simply to state that it is another example of Ray June's fine work, for Cinematographer June has of late been so consistent a bell-ringer that it is necessary only to read the words "Photographed by Ray June" to know that a first-class species of cinematography is forthcoming. In "When Ladies Meet," June has excelled himself for he has turned out an unusually fine picture under circumstances which were not always too propitious. He has made the players appear extremely well—Ann Harding and Alice Brady, particularly. He has, moreover, handled a picture enacted almost exclusively on pure white sets—often a difficult assignment—in an outstanding way. In a word, his entire technique in "When Ladies Meet" deserves commendation and—what is more—careful study in every particular.

"ADORABLE"

A Fox Production

photographed by John F. Seitz, A.S.C.

This production furnishes an opportunity for comparison of American and German film-technique in all its branches. "Adorable" was made, scene for scene, from a delightful German film called "Her Highness Commands" ("Ihr Hohezaar Befehl"). As entertainment, each is equally delightful, but the technique of the American-made version is immeasurably superior to the continental version. Speaking cinematographically, "Adorable" shows American cinematography at its best, reflecting the more favorable physical conditions obtaining here as well as the radically different styles of Hollywood and Neubabelsberg. Greater attention is here paid to personal lightings, and the production is presented in a decidedly higher key. The American settings, though less atmospheric than the German ones, are more sumptuous. Personally, I am inclined to blame Gordon Wiles for making his palace sets too reminiscent of St. Peter's, in Rome. One can't picture Janet Gaynor inhabiting a cathedral! The sound-recording is immeasurably better in the Fox version, of course, though our music is not of such high quality. The two films are, in short, extremely instructive to the student of motion picture craftsmanship.

Considered purely on its own merits, "Adorable" is an excellent picture. Photographically speaking, it is on a par with Seitz's finest work. His compositions and lightings are, as ever, well-nigh flawless; and his treatment of the stars is excellent. In several of the scenes he has had unusually light sets and costumes to work with, and he has

handled these in an exemplary manner. The use of lap-dissolves in portraying the successive promotions of Henry Gerst are amusing—and most effective. The use of the moving camera is highly intelligent, as it is used discreetly, and to good effect—or not at all.

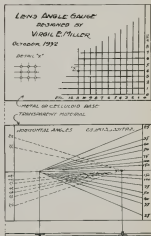
"INTERNATIONAL HOUSE"

A Paramount Production

Photographed by Ernest Haller, A.S.C.

Cinematographer Haller has few opportunities for cinematic distinction in such a wild farce-comedy as this, but he has done a decidedly commendable job. Everything had of course to be lit for comedy, moreover, part of the picture was made in Hollywood, and part, perforce, in New York. Despite these handicaps, Haller has turned out a very well-balanced job of camera work. The television in version which motivates what plot there is, is an excellent example of the possibilities of process photography, for which Fanciot Edouart is to be commended. The miniature and glass-shot sequences are also excellent, while the camera work of the ballet numbers adds a deal of interest to otherwise dragging spots.

A new lens-angle gauge designed by Virgil E. Miller, Camera Engineer at the Paramount Studio, and now available to cinematographers. Below it shows the opaque, etched base, ruled in squares representing feet, and perforated at the intersections of the rulings. Below it the angle-gauge, a transparent sheet of etched, ground or one-way to indicate the vertical angles covered by the most commonly-used professional lenses, with the horizontal angles shown on the other side. In use the transparent gauge is superimposed on the ruled base, with the registering-ports fitted into which—over the perforations on the base indicate the desired location of the camera, and the angular concept read off at a glance. The opposite angle is read in the same way, with the gauge turned over.





RIDDLE ME THIS

The Riddle. What can the cinematographer do to enhance a musical picture to increase the originality and effectiveness with which musical and dancing sequences are presented; to make them interesting and dynamic rather than dull and static?

CHARLES E. LANG, A.S.C., photographer of "Farewell to Arms" and "A Bedtime Story"

To my mind, this is more properly the problem of the director than of the cinematographer. Any cinematographer, however, will undoubtedly be able to furnish some ideas which, when worked out in co-operation with the director, the dance director and the musical director, will help to make the presentation of the number in question more definitely a part of the picture, rather than an arbitrary interpolation. This, of course, is simply in line with the cinematographer's invariable co-operation in the production of any picture.

Strictly speaking, I feel that musical films offer the cinematographer many interesting opportunities for artistic experimentation. The musical film, it must be remembered, is potentially a new artistic medium, differing alike from the conventional talking picture, the musical drama and comedies of the stage, and from silent or synchronized films. Some few foreign productions—such as Eisenstein and Tass's "Romance Sentimentale," and a few of the German musical-films—have hinted somewhat at the possibilities of this new field. Unfortunately, the majority of musical pictures thus far produced here have been more properly photographed musical-comedies or revues rather than the true film with music. A true film of this latter nature would offer the cinematographer a tremendously interesting means of expression, in which he could make his camera, lightings, angles, movement, and so on, play their parts like instruments of an orchestra. I should enjoy experimenting along this line tremendously—especially if I were given the opportunity to photograph a musical drama, in which the photographic technique would necessarily be more on the order of that of a dramatic picture than is the case with most musicals. The visual photographic possibilities of really great music—such as, for instance, some of the arias from Wagner or some of the Russian operas—would be tremendous, especially with the recent improvements in color-cinematography.

JOHN ARNOLD, A.S.C., Photographer of "The Broadway Melody" and "The Hollywood Revue"

More than a few of the nationally-known film-critics have pointed out that the Art of Cinematography has far outstripped the creations of the scenarioists, if this is true in the case of the regular run of dramas and comedy-dramas it is doubly so where film-musicals are concerned. The majority of our writers, directors and producers are approaching the musical film from the viewpoint of the stage musical-comedy—not from the viewpoint of the film-with-music. Accordingly, the Cinematographers assigned to photograph such films are to a regrettable extent forced to confine themselves to purely routine methods of photographing the

musical and ballet sequences. The inevitable result will be, of course, an exact repetition of the musical cycle of four years ago, the first few musicals released will succeed—and the many others now being rushed into production, being for the most part inferior copies of the first, which are, in turn, largely copies of stage musicals, will become less and less successful, until the last few will either lose tremendously, or end on the shelves—a total loss. The only answer is for the writers, composers, and so on, to strive to make musicals primarily for camera and microphone, rather than merely writing modified stage musical-comedies and expecting us to record them with camera and microphone. The true musical film offers endless opportunities, for they are virgin soil, but our cinematographers, directors, and producers are at present forced to till unproductive ground, waiting for writers with sufficient vision, and sufficient understanding of the cinema, to provide them with really worthy material.

JOHN F. SEITZ, A.S.C., photographer of "Adorable"

There is no need to expatiate upon the cinematic potentialities of motion pictures with music, we have not begun to explore them as yet. Under the existing conditions, however, we are all of us working under well-nigh insurmountable handicaps, for the work of the various individuals concerned in a production of this type is far from properly co-ordinated. For instance, in many of the musical films I have made, neither the director, the players, or I have had any idea of much of the music of the film while we were making the "musical" sequences. In some cases even, the music had not even been written! This left us in the position, figuratively speaking, of a singer who knew the words of a song, but not the music, or of a dancer who knew the choreography of her dance, but had no idea of the musical setting. Whatever is accomplished under such conditions is largely a matter of luck, and no more reveals the true possibilities of the medium than a baby's first babblings reveal the majestic English of Shakespeare or Milton. What is needed is more thorough preparatory co-operation between the writers and composers and the men on the set—the director, cinematographer, and ballet-master. Only when we have a complete understanding of all of the ingredients of a musical scene or sequence can we so co-ordinate our efforts of direction, lighting, camera-placement and movement, and all, to produce a truly satisfactory result.

HAL MOHR, A.S.C., photographer of "The Jazz Singer," "The Singing Fool," "Glorious Betty," "Broadway," "The King of Jazz," "I Loved You Wednesday," etc.

The production of a musical or ballet sequence is essentially much like the production of any other type of sequence, dramatic, comedy, or whatever the case may be. Accordingly, it has the same requirements: perfect understanding and co-operation between whoever is staging the action, and the cinematographer. Such a sequence should always have a definite story to tell, therefore the man who conceives the story, the man who supervises its enactment, and the man who records it on the film must understand each other, and be perfectly agreed on the method of telling the story with camera and microphone. Since each indi-

Continued on Page 103

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Special Filter

●Hamson and Hamson have developed a special filter for use in studios to give the proper correction in the faces of the players. This is a very light red filter and is said not to increase the exposure to any appreciable extent, but its use is claimed to eliminate the chalkiness that is so often the result without it.

New 8 mm. Camera

●According to an announcement from Stewart-Warner Corporation, that company has ready for the market a new 8 mm. camera. This camera weighs a trifle over a pound and a half. It takes the regular twenty-five-foot roll of 8 mm film which, when finished, gives the equivalent of 100 feet of 16 mm. in film time.

Electric Meter for 16 mm.

●William J. Grace, of Dallas, Texas, announces a new remote electric control device for the Cine-Kodak. The current is furnished by a 6 to 12-volt battery or can be operated on 8-20 volt A.C. It attaches conveniently to the camera and comes with 20 feet of cord.

Stressing Exposure Meter

●Both Willoughby and Weston stress the importance of exposure meters to the travelers during their vacation days. Going into different climatic and atmospheric conditions man find a change of exposure that will be different than the normal the Cine Filter is accustomed to on his home grounds.

New RolleiFlex Accessories

●According to an announcement from Burtough Brooks, American distributor of the RolleiFlex camera, several new accessories have been developed for use

with that popular camera. What is termed an iris-stop is now available. This is a clip on stop for the finder, and serves for ascertaining the depth of focus according to the focusing screen as an exposure meter. The Panorama-head is another interesting addition. When turned to the right a spring ratchet snaps from figure to figure. Each two adjoining figures give two connecting pictures. By this means you can secure a continuous panoramic picture. The stereo filament is attached to the tripod for the perfect production of three-dimension pictures with the RolleiFlex.

Another new accessory that is expected in this country soon is what is termed the Cine-film attachment. This accessory consists of an adapter back-panel with a counting mechanism (1 to 35), a film-guide frame for the cine format, a daylight take-up spool, single slide for Agfa-Lexa cartridges and an inlay frame for the focusing screen. The picture format is upright.

Semi-Professional Films

●Announcement from Bell & Howell that the 70DA film can be semi-professionalized will find considerable interest among advanced amateurs, clubs, and others. These professional improvements are all based on the present 70DA, which already has seven film speeds, three-lens turret, variable viewfinder and magnifying critical focuser. The special features which can be had on special order, or may be incorporated in the present film 70-D, include 100 to 200-foot film capacity, electric driving motor (12 or 110-volt), 8-to-1 hand crank for use without motor. This can move film backward for lap dissolve. It incorporates a mask box for double exposures and built-in range finder.

New Mitchell Filter Holder

●A variable Diffusion Filter attachment has been developed by the Mitchell Camera Company for use on their Filter holder. This attachment takes two variable diffusion filters of the same type.

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General Electric Projection Lamps

●The General Electric Company announces a new projection lamp in the 100-watt class that is said to obviate the expense and weight of auxiliary transformer or large resistance used in the past with low-voltage lamps. It is the contention of the manufacturer that these lamps give a screen illumination which averages nearly twice as high as those available two years ago.

The Biplane construction is now incorporated in five of the new lamps, in 500, 750 and 1,000-watt sizes.

It is also claimed that a marked advance has been made in the wattage for given size of bulb and a means has been

UP TO the present time the biggest problem of all portable sound equipment has been a satisfactory motor system. It has even been a problem in small truck installations where storage battery and motor generator weight is a serious problem. The prevalent system in use is the D.C. interlock type of motor, generating either in the regular D.C. winding or in an additional winding, an A.C. interlocking voltage. While this type of drive gives excellent results as far as locking the camera to the recorder is concerned, the big drawback still remains, manual control of the speed. The customary procedure is the insertion of a line voltage control rheostat which, with any change of load on either the camera or recorder introduces a corresponding change in the input voltage to the motors. This changes the speed of both camera and recorder, giving poor recording. A poorly loaded magazine, a bumpy take-up belt, or a number of other things can cause a momentary change in the load which may not be detected by the operator, since the tachometer itself has sufficient drag or inertia to remain steady on slight changes of speed. The results, however, show up as "wows" in music, giving a decidedly unpleasant effect.

After a year of development and research, the Hollywood Motion Picture Equipment Co., Ltd., has perfected a motor which solves all manual control difficulties, the "Automatic Speed Control Motor." While the idea is not new, it has never been successfully applied to a small D.C. interlocking motor. In principle, the recorder motor is varied by a mechanical and electrical means in accordance with the power taken from the motor. Before releasing this new addition to the present high quality line of "AntiReeves" recording equipment, an experimental motor was built which has been in actual use for over six months. A number of pictures have been successfully made with it and the results are considered amazing. On one picture the whole unit had to be brought up to speed and ready to record in not over three seconds because of the nature of the shots. With a manually controlled motor this is absolutely impossible, as anyone who has had to run a recording unit of this kind will testify. With the automatically controlled motor full source voltage is supplied to the motor until it reaches the controlled speed, and then the automatic control holds it there. Stroboscope tests have shown that with full load the recorder comes up to speed in less than three feet of film and never overshoots. It stops right on 90 feet per minute, and will stay within less than one-half foot per minute

Automatic Speed Control Motor

by

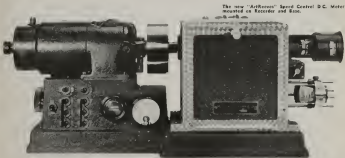
H. N. McNiff

Chief Sound Engineer, H.M.P.E. Co., Ltd.

of this mark through the entire change in load to which a recorder is subjected, namely, full magazine drag. In tests it has been found impossible to change the speed appreciably by holding the magazine take-up belt stationary, which would be the equivalent of a buckle.

The power required to drive this new motor is no more than that required on a standard D.C. interlocking motor. It is rated at 1-12 H.P., but on dynamic brake tests has been found to deliver up to 1½ H.P. without a serious reduction in speed. These ratings are without considering the automatic control. With the latter the power output is increased to about 1-6 H.P. before the speed is affected. When recording in a cold climate where the power required to drive any machinery is greater than normal this reserve of power is appreciated by the sound engineer responsible for results. Since the motor on a recorder is never run continuously for more than 11 minutes, heating is not a controlling factor in the performance of the motor and may be totally disregarded. With an "AntiReeves" recorder as shown in the illustration, the power consumed from the D.C. source is only about 50 watts under normal load. The customary method of supplying the D.C. is by heavy duty "B" batteries so connected that 135 volts is supplied to the motors. When using a camera with the recorder we use two sets of batteries in parallel for reasons of economy. While one set would run for around 10,000 feet of film,

Continued on Page 114



The new "AntiReeves" Speed Control D.C. Motor mounted on Recorder and Base.

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AMATEUR SECTION

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- AN UNUSUALLY interesting article by William Skell A.S.C. on the widely growing use of 16mm negative—its development and treatment.
- DESCRIPTION of another interesting Semi-Professional 16mm Camera. Giving the amateur a wider latitude to approach the effects of the Hollywood Cameraman.
- FINE Grain Development of the small negative. The wide popularity of the small negative camera has found a great growth amongst the Amateur Cine Filmer.
- JOSEPH WALKER A.S.C. tells the amateur how to make under water shots. Mr. Walker is famous in Hollywood for his ingenuity in getting the unusual.
- MAKING an Industrial by an Amateur 16mm User. He tells how he turned the eye of the 16mm camera on his own business to fine results.
- CONTINUITY will be discussed giving you the experience that the professional picture makers put on this phase of picture making.
- HERE'S HOW will be more interesting than ever. Many questions wait in our files for next month's issue.

*PROFESSIONAL Criticism of the Amateur picture is a part of the service offered by the AMERICAN CINEMATOGRAPHER. Many are not aware of this. Hundreds of pictures have been reviewed this past year by members of the American Society of Cinematographers for the Amateur and the critical opinion of these professionals given free of charge. There is no fee connected with this. You pay the transportation charges only. This service is rendered to help the Amateur attain the perfection toward which he is striving.



The thumb is resting on the adjustable shutter control of the new Eastman Cine Kodak. The shutter adjustment permits the making of fades and lap-dissolves.

When To Use Special Effects—and How

by

Dewey Wrigley, A. S. C.

PROFESSIONALLY speaking, the term "special effects" covers a multitude of scenes. As used in the studios today, any type of photography other than the regular run-of-the-mill work done on the set is classified under this heading. "Special Effects" photography may be anything from a simple lap-dissolve or "wipe" to intricate multiple-exposure process or miniature work. For the non-professional cinematographer, however, the wide range of special effects is naturally more limited, for the purpose of this discussion we may as well consider it to embrace only fades, lap-dissolves, wipes and the simpler types of double exposure. Even these have been, until recently, all but impossible to the average 16 mm. user, for the cameras available have been designed more for the beginner than for the advanced worker. Within the last sixty days, however, Eastman has come forth with the remarkable Cine Kodak Special, and both Victor and Bell & Howell have announced a new model incorporating a reverse-cranking feature, also there is the professional Bernet 16mm camera. Accordingly, 16mm. special effects have suddenly become objects of more than academic interest.

Simplest of these effects is the ordinary "fade-out" (and its complement, the "fade-in"). While it is possible to make fades with an ordinary camera, the best results will be had with a camera which—like the new Eastman Special—embodies a variable shutter. A fade-out is easily made by slowly closing the shutter (while the camera keeps on running) at the end of a scene. With the new Eastman

camera, this is done by slowly and smoothly moving the shutter-adjusting lever up to the "closed" position, at which point an automatic brake is applied, stopping the camera immediately. The fade-in is, of course, merely the reverse of this process. When using cameras not equipped with adjustable shutters, fades can be made by closing down the lens, but since most of us use SuperSensitive film all the time—and few fine lenses will close beyond f 16—this necessitates the use of an extremely heavy neutral-density filter or its equivalent, and the results are not so satisfactory.

The lap-dissolve (known as a "blend" in Europe, and as a "mix" in England) is simply a fade-in superimposed on a fade-out, so that as one scene fades out, the next fades in on top of it. This is done, of course, by first making a fade-out in the usual manner, then winding the film back (with the shutter closed or the lens capped) to the start of the fade-out, and fading in from that point. This is easy with the new C.K. Special, which is equipped with an accurate footage-meter, which runs forward and backward, the best practice is to start your fades just as the meter has turned from one foot to the next. The length of a lap-dissolve can be suited to the requirements of the scene in hand; the average professional lap runs from four to eight feet, but some—as in Joseph von Sternberg's "Dishonored"—have been known to run a hundred feet or more. For 16 mm. use I would recommend making lap-dissolves from two to three feet as a rule. It takes a bit of practice to be able to manage this dissolving shutter smoothly, and if one is going to make many of them, an extension-arm on the shutter-control lever would be a distinct advantage. A useful little trick practiced by most professionals is to let your lap-dissolve overlap a bit, that is, when you rewind after making the fadeout, wind six or eight inches beyond the point where the fade-out started, and start your fade-in there. This of, course, makes your incoming scene start fading in a moment or so before the other begins to fade out, and brings it entirely in before the first scene is entirely out. In other words, this trick makes your lap a little longer, and very much smoother.

If you saw the Cine Kodak Special demonstration-reel, you will remember one shot in which the use of the oval matte was shown, with the matte very slowly fading in over the unmatted shot. This, of course, was done by making the lap-dissolve unusually long, with the fade-out part quite a bit longer than the fade-in part, and overlapping the latter very considerably.

Wipe-offs don't differ materially from fades, excepting that they are made by some sort of a blade moving in face of the lens. Since they were very expertly described in the February issue of this magazine by Frank B. Good, A.S.C., there is no need for me to bore you with further descriptions of them, except, perhaps, mention that the reverse-crank and accurate footage-counter of the new Eastman facilitate them tremendously.

There is another type of trick transition, lately used professionally, which furnishes an interesting gag for the amateur—and which, incidentally, is surprisingly easy with the new camera. On the screen, instead of fading, lapping or the like, this transition gives the effect of the incoming scene putting itself together like a jig-saw puzzle. Here's one way to do it. Begin by making the second scene first. Then, make a still enlargement of the first frame of this scene, have it mounted and cut as a jig-saw puzzle (with not too many pieces). Then go ahead and make your first scene, fading it out slowly, and winding back in the usual manner, just as though you were going to make a lap. Now take your camera indoors, and line it up with the lens pointed straight down on a black board, and so that it will exactly cover the area of your jig-saw enlargement. Then with the camera set for single-frame work, and, of course, the proper lights and so on, build up your puzzle, piece by

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Correcting Exposure Faults —in the Dark Room

by
William Stull, A. S. C.

IT IS unfortunate, in a way, that the laboratories and methods of the processors of 16 mm. film are so perfect, for this perfection not only gives most of us little incentive to delve into the fascinating realm of laboratory-work, but also gives us a feeling that if our errors in exposure are greater than the leeway provided by the latitude of modern 16 mm. film and the extensive control of the automatic processing-machinery, our badly-exposed scenes are beyond redemption. Sometimes this is all too true, of course, but not invariably.

If you entered cinematography by way of still-photography, you probably realize, without being told, that certain chemicals will build up, or "intensify" a weak image, while others will lighten, or "reduce" an over-dark one. Both of these processes can be carried out in daylight—and they are quite as feasible with one film as they are with the plates and films of the still-photographer. Moreover, the better 16 mm. processing plants (especially those of Eastman and Agfa) are fully able to reduce or intensify 16 mm. films, sometimes they do this as a part of the regular processing, in cases where their own work has for some reason been faulty, or in cases where it is obvious that such modification would be of great benefit to the film. In any event, they will reduce or intensify over- or under-exposures on special orders, at a nominal charge. But it is so easy to do this yourself, and so interesting, that many cinematographers will, I am sure, find it worth their while to try their own hands at it.

If you've had experience in intensifying and reducing still negatives, you will know something of the action of these solutions, but you will have to remember that, in working with reversal film you are actually working upon a positive, and where you **intensify** an underexposed still negative, you must **reduce** a reversal-film, and where you **reduce** an overexposed still negative, you must **intensify** the reversal-print. On the other hand, of course, if you are using the negative-positive system, you can intensify and reduce the negative exactly as you would if it were a "still"—and forget about the print. In working with reversal film, there is also another important factor, which must be remembered: some reducing and intensifying agents tend to color the emulsion, and while this is really an advantage in still or negative work, it is a serious disadvantage in working with reversal film, which must be projected. Accordingly, the most satisfactory solutions to use are those which do not alter the coloring of the silver deposits that form the image.

The equipment necessary for this work is essentially the same as that recommended for tinting and toning in an article on those processes in the May issue of "THE AMERICAN CINEMATOGRAPHER." It can be extremely simple, whether a capacity of five or ten feet of film at a time is desired, or if larger quantities are to be treated. Some methods of intensification and reduction call for three or more solutions, and all of them require at least two and a wash, but this, of course, is merely a matter of providing sufficient trays or tanks.

Intensification is probably the more satisfactory of the two—as—due to the nature of the reversal process—it has the greater opportunity to produce results. Neither process will, however, produce detail that is not at least latent in the original film.

INTENSIFICATION

As Crabtree and Mueller have pointed out (Journal of the S.M.P.E., Vol. XVII, No. 6, P. 1003 et seq.) intensifiers may be classified according to their chemical action, under four headings:

1. The silver image is alloyed with mercury.
2. A neutral or colored compound is deposited on the silver image.
3. The silver image is more or less replaced by a colored compound of silver, a colored compound of another metal, or by a dye.
4. Metallic silver is deposited on the silver grains.

For treating reversal film, which must be projected, Nos. 1 and 4 are probably the most successful. A very satisfactory formula for a mercury intensifier is the Eastman In-1 formula, a modification of the well-known Monckhoven's Intensifier. This solution is:

Mercury Intensifier (In-1)

Mercuric Chloride	3 oz.
Potassium Bromide	3 oz.
Water to make	1 gallon

The film is bleached completely in this solution, washed for 5 minutes, and re-developed in either the Eastman D-16 formula or any regular MQ developer, washed and dried in the usual manner. This formula is especially good for purposes in which a high degree of contrast is desirable, and may be

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An enlarged strip of 16 mm. film. The upper portion is of overexposed film before being intensified which is shown in bottom half of illustration.



Filming The National Air Races

by
Norman de Vol, A. S. C.

THE grandstand at the Los Angeles Municipal Airport, where the National Air Races will be flown the first four days of July, this year is at the south side of the field, facing north. That means an even front and side lighting. Sixty feet in front of these stands will be a strong wire fence, beyond which nobody will be allowed. Just across this fence will be the pits—stalls for the contesting planes. One thousand feet straight out from the grandstand, in the middle of the field, will be the home pylon, around which the racing planes will turn, and which marks the start and finish of the races. The race-course will be behind the stands, so that the ships will come past the ends of the stands to turn around the pylon, yet never be heading into the crowd—a very important safety precaution.

The sixty-foot parking between the stands and the fence, for instance, as well as the construction of the fence itself, gives the amateur a great deal of leeway in selecting his set-ups, and the occupants of the grandstands are free to come and go in this space in the sections lying in front of their seats. Placing the pits just in front of the fence, too, gives the photographer an opportunity to make closeups of the various planes, and candid-camera shots of the famous pilots, without being either in the way or in danger of decapitation from an unnoticed propeller.

Filters will depend on the immediate conditions, with semi-chromatic or Ortho films filters don't cut much ice, with either type of film you'll get the best results with the Aero 2 filter or—if there are clouds—the 23-A. In a pinch you can use a K-2 or K-3, but the best all-around filter will undoubtedly be the Aero 2. The exact choice, of course, will have to depend on the effect you want to get, whether you want to have the ships dark against a light sky, or vice-versa.

Your best bet will probably be a two-inch lens; you don't want to get too close to the racing planes, for then the matter of following their movement becomes rather complicated; so a two-inch will take care of most of your needs, and a regular one-inch, held in reserve, will be useful for closer shots, such as scenes of the ships in the pits, etc. And the two-inch (or even a three, if you have a turret camera) will give you some surprisingly good candid-camera closeups of the different acts when they are in the pits.

By all means use a tripod; of course, it means more bulk to lug around—but it's the only sure way of getting your horizon level in the fast shots of the races. And you've got to have your camera level if you want your pictures to be really good.



There are four days of races, and I would suggest planning to use at least 200 feet of film per day, more will be better, if you can afford it, for it will give you leeway for N.G.'d shots and unexpected action.

A fine background for your main title would be a head-on shot of an airplane with a steel propeller "hitting over," underexposed or filtered down so that it will be very dark, with just the highlights here and there twinkling on and off as the metal prop revolves.

There will be Army, Navy and Marine Corps demonstrations of fighting, attack (ground-strafting), bombing, smoke-screens, etc., which will be extremely worth shooting. There will be daily exhibitions of stunting by a trio of Hollywood's leading film-stunt-fliers and by several of Europe's foremost aces, which will demand your attention. There will be the finish of the Bendix Trophy race for men, and the Aero Trophy race for women, in both of which the greatest of fliers will participate, and in which speeds of about 300 m.p.h. will be seen. There will also be attacks on the world's land-plane speed record for men and women, with still higher speeds certain. On "Movie Day," a number of the flying stars of Hollywood—Lt. Ben Lyon, Lt.-Commander Wallace Beery, Ken Maynard, Hoot Gibson, Sally Eilen, Ann Harding, Howard Hughes, Henry King, Bert Glennon, Hal Mohr, A.S.C., Clarence Brown, Douglas Shearer, A.S.C., Elmer Dyer, A.S.C., and other flying picture-celebrities will participate. At night, for the benefit of those with fast lenses and Super-Sensitive film, there will also be night flying, stunting with illuminated planes, and the like.

It would suggest that you merely study the first day's races through your finder, as most of them will be repeated later, and the practice will be more valuable than the film—though if any crashes occur, you might do well to catch them. (As the races are getting better organized each year, crashes are becoming fewer and fewer.) The first events that you should get will be the arrival of the Army and Navy squadrons, which should be spectacular, with the many squadrons arriving in formation and landing. Next will come the attack on the world's speed record for women. This will probably call for the one-inch lens, as the tiny

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L. Guy Wilky, A.S.C., explains some of the basic principles of exposure to the author.

What I Learned From A Professional

by
Homer Matheson

Contributor

IT'S the simple things that count. That at least is my impression after talking to L. Guy Wilky, A.S.C., whom I met on the boat crossing the Pacific.

He was coming back from Ceylon. The first question I popped at him was what is the normal exposure in Ceylon, down there in the tropics.

He never told me. And I did not realize it until right now, although we talked photography and cinematography for several days. I have the impression from his talk with me, that he, as well as most of the leading cinematographers, received their first training and knowledge from the still camera.

The most interesting discussion centered around the exposure guide on my camera. He first translated this from the still camera standpoint into aperture and time, showing me the equivalents of the various apertures in their relation to time. He laid it out for me as follows:

Seconds	1-5	1-10	1-25	1-50	1-100	1-200
Aperture F	16	11	8	5.6	4.0	3.5

and explained that all of these were equal. The results, so far as quality of negative was concerned, would be the same, excepting, of course, where we use the smallest stop there is a greater depth of focus.

From here we took the 16-picture per second interpretation. My camera has a 205-degree shutter, which gives approximately a 1-28 second exposure. In view of the fact that it is not adjustable, as is the professional camera, there could nothing be done with changing the time from the shutter standpoint, so when pictures were being taken at 16 frames per second the only thing I would have recourse to for different lighting conditions was the lens itself.

This, however, did give me a fine conception of the values when taking slow motion pictures. I realized from this description that if I were to take pictures at 32 per second I would have to open one more stop—the same as though I were shooting a still camera, and increased the speed from a normal of 1-50 of a second at F 5.6 to 1-100 of a second I would have to open the lens to 4.0.

He pointed out that the mathematician would prove that the stops as he indicated were not exactly again as fast, but for all purposes, and because of the latitude of the reversible film, they would serve admirably. They were the stops as indicated on the camera and the lens manufacturers have made these markings to indicate as closely as possible with standard readings the next largest or smallest exposure.

The more I studied this over the more basic I realized this simple information was. It was something that I had accepted, but had not really classified in my mind.

In the discussion I realized that in the use of filters, if I knew the factor, it was simple to figure out the correct stop. Here's how it worked out: I must first find my normal exposure and square that. Let's say the normal is F 11. Multiplying the figure by itself gives you the square of that figure, so 11x11 would equal 121. Let's say the factor I am using is 6. I then divide the square of the stop by the factor, which gives me 121 divided by 6, giving me as an answer approximately 20. The next step is to find that root of that number. We know the root of any number is that number which multiplied by itself will equal the number. In other words, the root of twenty is the number which, multiplied by itself, will equal 20. This number would be approximately 4.2, which would be the lens reading. I familiarized myself with this formula by taking the various stops and different factors and working them out until that formula is firmly entrenched in my mind. I have read it many times, but it always seemed so confused to me. I am wondering if in the simple way I have told it, it is still confusing to some.

He also showed me how to find the speed of one stop over another. This requires a bit more "square rooting" and quite as simple. You divide the square root of the smallest stop by the square root of the largest stop, and there is your answer. Let's say we want to find how much faster F19 is than F3.5. We then multiply 3.5 by 3.5, which gives us 12.25. We then multiply 19x19, which gives us 361. We now divide 12.25 by 361 and we have the speed, which is about 3.4. This means that F19 is approximately three and a half times faster than F3.5.

I wondered how they determined their exposure in different parts of the world as they traveled. Wilky told me that the usual method is to make a test going through various stops, developing that test and from that determining the correct normal stop. He stressed the importance of

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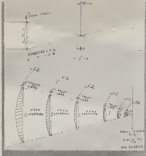


Fig. 2 at top. Fig. 1 at bottom.

What Is F.2 F.3.5 F.4?

by
Hartley Harrison

Chief Engineer

AS the photographer of today is getting farther and farther away from the box camera, we hear more and more the expressions such as shutter opening depth of focus, the lens stops of F.2, F.3.5, etc., and when a certain picture is being discussed between fellow photographers the stop used is always mentioned as a general way of indicating the exposure and telling the other fellow how it was done.

However, the surprising thing about the use of the expression "lens stop" is the great variety of interpretations and meanings that it is intended to convey. And since the interpretations are too numerous to even attempt to explain, it might be well to refresh ourselves as to what F.2 or any other stop actually is, rather than what it is intended to mean.

If we look at the graph in Fig. 1 we see a number of lenses placed in a dotted angle. The lenses are of different focal length, which positions them a certain distance from the film and of a sufficient size to fill the angle in their respective positions, but all are marked with the same F value. The dotted line is intended to show a cone of light

and as you move further out into the cone you must necessarily have a larger lens to catch all the light in the cone, and unfortunately, as we increase the size of the lens, the curve is lessened and the focal length is increased, because the hemisphere, or half of a ball, is the greatest variable curve that can be made, and if we wish a larger lens we can only make one-half of a larger ball. But the reverse is also true in that the stronger the curve the closer the lens must be to the film and the further down in the cone its position is. The diameter of each lens is marked and also the focal length, and as we have chosen simple combinations it can readily be seen that if the focal length of the lens is divided by its diameter the result will be 2, in all of them, which in this particular illustration are the F values. And that is exactly what the F value means.

Instead of saying that the focal length is, let us say 6 inches, and the diameter or aperture is 3 inches, and letting the other fellow figure out whether that would be a large or a small opening for that focal length lens, it is just prefigured by the lens manufacturer and stated as the F value. Obviously, if the free aperture or diameter is diminished and then divided into the focal length the F value will be higher, also the amount of light which can enter the lens will be less.

But let me repeat, the F value indicates aperture relative to focal length, and nothing else, and it is not an indication of the amount of light or exposure that the lens will give except as one stop is relative to another stop on the same lens. For instance, a lens set at F.2 will give four times as much light as the same lens set at F.4, but that in no way is an indication of how much light the lens gives at F.2, or how much exposure on the film, it only means that at F.2 there is four times the light that there was at F.4, whatever that amount was.

Practically all the lens manufacturers mark the lens stop so that each stop cuts the light in half from the preceding stop, such as an F.4 lens which is wide open will have the next stop at F.5.6, and the next one at F.8, and so on, F.5.6 being half the area of F.4 and F.8 being half the area of F.5.6. Obviously, if the area is cut in half the light will be out in half also.

Although the graph shows only simple plano convex lenses, the rule is the same for corrected lenses, and the number of lens elements used is immaterial, except that sometimes it is a little more difficult to measure the free aperture. However, the additional elements decrease the transmission of the lens over a simple lens and the transmission varies from 90% for a simple lens to as low as 38% for some of the corrected lenses depending upon the number of elements, the type of glass, the lens curve, and whether they are cemented or glass-to-air.

This variation in transmission is present in practically every different type of lens combination, so that an F.2 lens of one optical combination will not necessarily have the same transmission as another F.2 lens of a different combination.

In fact there has been such extreme differences in transmission of lenses that have been put on the market, as only 38% transmission for an F.1.5 lens and 62% transmission for an F.4 lens, that merely comparing lens speeds by their F value is sometimes very misleading.

And it has been suggested that photographic lenses be marked as to their transmissions and in that way definitely couple the stops with the lens' speed. For instance, suppose an F.2 lens has a transmission of 50% of the incident light, when the lenses are wide open and set at F.2. At F.4 the light will be one-fourth of 50%, or approximately one-eighth of the incident light, and by measuring the incident light we can definitely ascertain how much of the incident light is actually being impinged upon the film with every

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Master of Movie Miracles!

As example of a double exposure shot, Gary to make with the Special! One exposure of the girl and room—wind blows—another exposure of the man against a dark background! That's all there is to it. Ten, with the variable shutter, he can be made to fade in, then fade out.



Ciné-Kodak SPECIAL

A professional-type camera using 16 mm. film

UNEQUALLED among 16 mm. cameras in ability, Ciné-Kodak Special ignores the restrictions of ordinary movie making technique. It creates wholly new opportunities for movie clubs, doctors, scientists, engineers . . . challenges even the highest movie making ambitions . . . opens the bag of Hollywood tricks.

Double exposures . . . dissolves . . . fades . . . slow motion . . . animation . . . mask shots . . . are all a part of the Special's repertoire.

The standard model of Ciné-Kodak

Special is equipped with a Kodak Anamagmat f.1.9 lens, double lens turret, one 100-foot film chamber, a set of six masks. Cam, thus equipped, \$575. Despite its unparalleled versatility—no varied are the uses to which the Special will be put that occasional minor alterations or special accessories may be necessary. Inquiries relative to such work should be forwarded by your dealer to the Eastman Kodak Company for advice and estimate.

FREE BOOK AVAILABLE

A copy of the Ciné-Kodak Special book will be mailed to you free upon request, Eastman Kodak Company, Rochester, New York.



REFLEX FINDER

The reflex finder shows an a ground-glass screen the field of the taking lens—provides visual focusing with all lenses.



VARIABLE SHUTTER

The Special's exclusive variable shutter makes fades and lap dissolves easy and certain—gives exact exposure control.



HAND CRANK

The light, and one-hand hand crank cranks film more easy—strong than winding back for dissolves, double exposures.



INTERCHANGEABLE FILM CHAMBERS

Interchangeable 100-foot and 500-foot film chambers enable you to switch from one film to another in a few seconds.

IF IT ISN'T AN EASTMAN, IT ISN'T A KODAK



Making Tests With an 8 mm. Camera

by
Robert Breeze

Cinephotographer

I FUSSED around for several weeks trying to cheat the manufacturer of the 8 mm. camera. I wanted to enjoy the economy of the 8 mm. in some tests, but I didn't want to invest in an outfit. But today I own one.

But let me tell you of some of the fun I had trying to make an 8 mm. out of a 16 mm. I cut a mask exposing just one-quarter of the aperture of the 16 mm. I placed this right in front of the aperture, how I did it is too long a story and not worth the effort. I ran the film through once, then without rewinding ran it through again. Then I changed the mask to the other side, ran the film through again and then without rewinding ran it through the fourth time. I had to go through all of this bother again on the projector. It was fun figuring it out, but a nuisance doing it. So I bought an 8 mm. camera.

Since I have it, it strikes me that cameras are getting like automobiles. It is not a happy home unless you have two in the family. When I am not using it for testing, my wife uses it, in fact, she has appropriated the camera as her own, and it is now known as "her" camera.

However, the real value I have found in it is that when I am going to undertake a serious bit of cinefilming, something about which I want to be dead sure, I will usually take it first in 8 mm., at least those phases of it about which I feel a bit uncertain. This permits me to do some

testing with economy. Gives me a confidence in the work with the 16 mm. that I would not have otherwise.

You can do practically everything with an 8 mm. camera that you can accomplish with a 16 mm. so far as straight shooting is concerned, and that is what most of us are doing.

If I am going to do a picture that has a bit of continuity in it and my family is acting as the cast, I usually shoot that picture first in 8 mm. I find my weaknesses and faults. Find how I can improve angles, where I can inject more close-ups and things like that, how to improve the close-up and other vital angles. It helps me tremendously in improving technique in picture making. I do not feel so sensitive about shooting 8 mm. in this way, it doesn't seem like an extravagance. In fact, I feel more extravagant shooting the 16 mm. and getting poor results than I do in experimenting with the 8 mm. Possibly it is just psychological reaction, but there is something about shooting 16 mm. where one is a confirmed cine filmer that doesn't permit us to throw it away or to look upon it merely as an experiment.

I find, too, that it has helped me to educate my wife in the mysteries of photography that I did not seem able to do with the 16 mm. I suppose the 16 mm. to our minds is like using an expensive car to teach some novice how to drive. We would sooner use some old auto for this, feeling that the learner cannot harm it very much.

I find that the 8 mm. is giving me an interest in new things. I do not hesitate to experiment a bit with it. Such as attempting to secure pictures of ants. Playing with the lens and a ground glass, turning it out as far as possible and placing a shim back of it so as to shorten its focal length. I have experimented in this fashion and then to secure a closer focus have contrived to mount a portrait lens in front of the regular 1-inch lens.

In some instances I have secured pictures which I feel are a great deal better than some I have attempted in 16 mm. This is not because of the equipment, but because of the freedom I have felt in taking them.

I tried, in addition to turning the lens out and the portrait lens in front of that, of also adding another glass, a reading glass. I got as close as 5 inches by this method. I know it will be possible to get up within 2 inches, but this was just my first experiment. I had not built shims for turning the lens out to its furthest point. But I did find with this addition of the reading glass that one must be mighty careful, as the addition of too many glasses is inclined to give you distortion on the least provocation.

Don't treat the 8 mm. with disdain. Excepting for the fact that it does not give as large a picture as the 16 mm., it has practically everything the average 16 mm. camera possesses. Give it the same attention. Give it the same respect in the making of pictures and you will find some dandy surprises on the screen. In fact, if you let yourself go a bit in the use of it and try some of the things you have been waiting to experiment with. Some of the things you would like to do if you had the nerve, you are going to convince yourself you are a great deal better photographer than you believe you are.

I have tried imitating the professional with it. You know, shooting up at a tall building, getting that modernistic angle. I jacked my car up at the rear, then made the wheels go around to cut in a close-up on a traveling scene. I wanted to see the best angle to shoot such a scene. I tried it at various angles with the 8 mm., something I wouldn't have done with the 16. I found the right angle and then proceeded to regeter that scene in the 16 mm. picture I was making. I find the 8 mm. a handy possession.



REFLECTIONS ON GLASS AND SILVERWARE In making close-ups of goblets or a plate I am working on. I've had a great deal of trouble with unwanted reflections from the silver and glassware. How can these be prevented?

H. P. K. Denver

● In some instances, careful attention to lighting will be all that is required, but there are several simpler and quicker expedients which will always work. Glasses, goblets, and all hollow glass or silverware can be filled with ice or ice-water, when brought into a warm room, or under the heat of incandescent lights. This will cause the outer surface to become dewed, and non-reflective. Dabbing the surface with putty will also kill all reflections; this is done daily in the studios.

HAROLD WINSTROM, A.S.C.

PURE ALCOHOL Several for miles I am working with specially alcohol, but I have been unable to get any which does not contain the Prohibition Dept.'s additions. Can one be obtained which is pure enough for photographic use?

R. V. J. Cleveland

● You can get chemically pure alcohol from any chemical or bacteriological supply house by asking for Eagle methanol, Colombian methanol or spirits, or methyl alcohol, C.P.

PARK RIES, A.S.C.

FILTERING THE MACON During our the Maca's trip to the to photograph the Maca and the other Naval districts in the air. What filter and filter should I use to get the best results?

J. C. C. Lakeland N. J.

● Since the envelopes of these craft are coated with aluminum pigment, your problem is to darken the sky so that they will stand out boldly. I would therefore recommend a 23-A or even an F filter if you use Super-Sensitive film, or a G filter if you use regular Pan. In either case, hold your exposure down, and see to it that the ship is against clear blue sky, not a hazy greenish-blue sky. Also, don't try to get it against white clouds, though clouds are excellent in other parts of the

HERE'S HOW

by A. S. C. Members

Can You Answer These Questions

These questions were submitted by the Los Angeles store of the Eastman Kodak Company at the June meeting of the Los Angeles Cinema Club giving prizes for those who could give the most correct answers in 8 minutes. Try your hand. Then see the correct answers on page 112.

1 How much more exposure does F 8 stop give than F 16? (Check correct answer with X.)

2X. — 5X. — 8X. — 4X.

2 Give a 1-inch lens working at F 8 how much exposure as a 1-inch of F 8?

Yes. — No.

3 How many times does a 4-inch Telephoto magnify over a normal 16 mm lens?

2X. — 4X. — 5X. — 4X. — 12X.

4 In which direction should one pan—

Left to right. — Right to left.

5 Approximately what is the nearest correct exposure at which an Eastman Cine Kodak operates? 1/100.

1/75. — 1/5. — 1/32.

6 How many frames per second does a 16 mm camera operate at normal speed?

24. — 16. — 12. — 64.

7 The correct stop is F 8. You will put on a 4 filter. Where should you now set the diaphragm? F 16.

1/11. — F 5.6. — F 4.5. — F 9.

8 If F 8 is the stop to use at 16 frames, what should you use at 64 frames?

F 16. — F 11. — F 4.

9 What effect does a Red Filter have on the sky when used Panchromatic film?

10 How many pictures are on a roll of 16 mm film?

16. — 108. — 40. — 12.

11 Approximately how long does 100 ft. of 16mm film run in minutes at normal speed?

2. — 1. — 4. — 5. — 6.

12 Over exposure makes a dark or light (underlight) correct world picture on 16 mm normal film.

13 Which gives the largest field—a 1 inch lens—2 inch lens—6

14 When using Regular Panchromatic film the stop is F 8. What should you use with Super Sensitive Panchromatic film?

F 16.

picture. The only time to silhouette such a ship against light clouds is when the clouds are in the sunlight and the ship in the shadow.

HARRY PERRY, A.S.C.

FILTERS What are the factors of the following filters with ordinary and superspeed Pan film: X1, G, 23A, 56, 90, 1N5 and 5N5. Also of the combined 23A and 56 for night effects? What are 90, 1N5 and 5N5 used for?

R. C. R. Columbia

● The filter factors as represented are contained in the following table:

Filter	Type 2	Factor	Super-sensitive
X1	1	1	1
G	1	1	1
23A	1	1	1
56	1	1	1
90	1	1	1
1N5	1	1	1
5N5	1	1	1
23A+56	1	1	1
12	1	1	1

The 72 filter is not recommended for use with Type Two and the use of the 23A+56 combination is not recommended for Super-sensitive. The use of the 23A+56 combination with Type Two is to enable one to produce night effect scenes under sunlight conditions. The 72 filter is made up of with Super-sensitive for this same purpose. These filters for night effect work, when used with the proper emulsion, should be used at apertures from F 8 to F 3.5, depending upon the light condition.

The No. 90 filter is used as a viewing filter in that it reduces the visual effect obtained through it to a monochromatic value, thus enabling the eye to judge the lighting contrast nearly unaffected by color.

The 3N5 filter is made up of the Aero 1 and a neutral density of 0.50, transmission of 32%, while the 5N5 is made up of the Aero 2 with the same neutral density. These are single filters with the respective dyes of each incorporated in them. The purpose of these filters is to give the color correction effected by the Aero 1 and 2 respectively but at the same time causing a decrease of exposure due to the neutral filters, thus allowing the cinematographer to make his exposure at a relatively large lens aperture on exteriors. By so doing the depth of focus is decreased and attention is centralized on the object in focus.

The X1 and the 56 filters are both green and are not generally used for exterior cinematography. Their use is more applicable to commercial photography using panchromatic emulsions.

EMERY HUSE, A.S.C.



Set used to demonstrate Eastman Cine Special at Cine Club meeting

Los Angeles Club Holds Unusually Interesting Meeting

Under the generalship of William Winter, manager of the Los Angeles Eastman store, the June meeting of the Los Angeles Cine Club was given a program that was claimed by many to be the ideal meeting.

The program was complete in every detail, with the new Eastman Cine Special being the center of interest. There were no long talks: Mr. Babbo, general western representative for the Eastman stores, spoke briefly on the history of the 16 mm. camera from the time of its first being launched in a large way by Eastman some years ago up to the development of the present 16 mm. Cine Special.

A fine demonstrating reel was projected, showing fades, lap-dissolves, wipe-offs and the other seeming miracles that this camera performs. A mighty fine Kodachrome was shown which was plainly seen on the large screen by that portion of the audience that was sitting approximately 100 feet from the screen.

A professional make-up artist from the Max Factor Company was present to make up the girls who were used in a picture taken right there at the meeting. He explained the reason for making up the girls which acted as models. Ned VanBuren, A.S.C., set the lights for the

picture and then pictures of fades and dissolves were made which will be presented at the next meeting of the Los Angeles Cine Club.

For those clubs who wish the details of this program, a copy can be had by writing the editor of "THE AMERICAN CINEMATOGRAPHER." This meeting ran so smoothly and was so highly enjoyed that its success undoubtedly would be duplicated with other clubs.

Putting Continuity in Birthday Picture

Birthday pictures just must be made.

Just such events were the reason for developing the 16 mm. camera and film. Continuity, however, has been somewhat the bugaboo of the producer. W. Gaertner tells how he has solved this.

I have just completed a little sketch which covers six years of birthday films of my little girl. The film dates up to a few days before her seventh birthday. The opening scene is laid in the living room with her mother telling her to address the birthday invitations. From this I cut into addressing envelopes in daughter's own handwriting (which, of course, is very crude), mailing, bedroom scene on morning of birthday, children arriving games on lawn. Suddenly mother calls to children. Do you want to see the movie? Children running projector—screen and room background with opening title of first birthday, with succeeding annual affairs. At end it fades to blowing out candles on cake. Close-up of each child at table leaving house, with final scene of daughter standing alone in close-up waving good-bye.

Prize Picture at Chicago Fair

"Lullaby," the picture which was given second prize in the American Cinematographer 1962 contest, was selected by the Bell & Howell Company for showing in their exhibit at the Chicago Century of Progress.

This picture has gained national fame through this contest because of its fine composition and photography. Schools in various parts of the United States have requested copies of this production to be placed in the school library for elementary grades.

The many clubs who have witnessed it, as well as the professionals to whom it has been shown, have showered it with great praise.

Kansas City Club Views Lullaby

At the last meeting of the Kansas City Cinema Club the main feature of the evening's entertainment was the third prize-winning picture in the 1962 American Cinematographer Amateur Contest, "Lullaby," which was made by Okamoto of Japan.

This picture has been conceded by all of the clubs and those interested in 16 mm. work who have viewed it, one of the finest subjects ever to have been photographed with a 16 mm. camera. It is an outstanding work both from the photographic and composition standpoint.

Brackett Makes Novel Wipe-off Holder

C. E. Brackett, who is associated with the Hollywood branch of the Bell & Howell Company, has conceived a simple but effective wipe-off gadget for his 700 Film.

The illustration at bottom shows how he has fastened a piece of wood to the alignment gauge and at the front of that another piece in which he has cut grooves into which he fits a black cardboard. He has this groove marked at the point where the wipe-off starts and where it finishes. With the swivel arrangement he manages also to use these wipe-off effects from many different angles.



Forbes Filming Bugs With Telephoto

Kenneth B. Forbes of Claremont, California, is getting close to earth with his camera. His effort is toward a production whose main characters will be the bugs of Southern California. Forbes is using a six-inch telephoto lens attached to a reflex prism finder.

Correcting Exposure Faults in the Dark Room

Continued from Page 101

repeated if greater density and contrast are desired. To increase the contrast very greatly, when shadow-detail is not important, the following can be substituted for the regular re-developer:

Sodium or potassium cyanide 2 oz.
Silver nitrate 3 oz.
Water to make 1 gallon

Dissolve the cyanide and the silver nitrate separately, then add the latter to the former until a permanent precipitate is first formed; allow the mixture to stand a short time, filter and use. This latter solution is deadly poisonous, and should be used with extreme care.

As a simpler method equally efficacious, but better suited to the requirements of the average man, I have found that the well-known "Victor" intensifier—which appears to be a variant of the Monckhoven formula—and the ordinary Eastman MQ ready-mixed developer are excellent. The illustration was produced by this method. I found that, on the average, an immersion of from two to six minutes in the bleaching solution produced as high a degree of intensification as is normally necessary, with an average of perhaps 2½ minutes for most scenes. Re-development takes about five minutes, and don't fall into the mistake of

removing the film from the developer too soon, or you will lose in the effect you wish, and also leave some trace of color on the film. When used with certain of the semi-chromatic reversal films, the Monckhoven intensifier has a tendency to increase the natural purplish-brown tone of the film, considerably, though by no means objectionably. As some of these films do not use a fixing-bath after the second development, it is also wise to fix the film thoroughly before intensifying. The results obtained by this process are really surprising, some of my tests having salvaged scenes so badly over-exposed as to be quite worthless otherwise.

It may also be observed that certain of the toning solutions referred to in the article on the subject in the May issue also have a certain intensifying effect—especially the "Tabloid" Blue and Secor toners, of course, they also color the image, as well as intensify it.

Certain of the commercial Chromium intensifiers are also useful, though they have a greater or less colorative action, as well. The Eastman In-4a is an excellent formula for this type of intensification.

The most nearly ideal solution, however, is the silver intensifier, which is extremely powerful. (Crabtree and Muehler report having achieved an intensification of 140% by repeated applications), gives an absolutely neutral image, and

assures lasting results. An excellent formula for such an intensifier is:

Silver Intensifier (In-5)

Stock Solution No. 1	
Silver Nitrate	2 oz.
Water to make	32 oz.
Stock Solution No. 2	
Sodium Sulfite (desiccated)	2 oz.
Water to make	32 oz.
Stock Solution No. 3	
Sodium Thiosulfate (crystal)	3½ oz.
Water to make	32 oz.
Stock Solution No. 4	
Sodium Sulfite (desiccated)	2½ grs.
Eloxi	35 grs.
Water to make	96 ozs.

The intensifier is prepared as follows. Slowly adding one part of solution No. 2 to one part of solution No. 1, stirring to obtain thorough mixing. The white precipitate which appears is then dissolved by the addition of 1 part of solution No. 3. Allow the resulting solution to stand for a few minutes until clear. Then add, with stirring, 3 parts of solution No. 4. The intensifier is then ready for use and the film should be treated immediately. The time of intensifying averages between 10 and 25 minutes, but should not exceed the latter figure. After intensification, the film should be immersed in a plain 30% hypo solution and then washed thoroughly. The life of this solution averages from 30 to 45 minutes after which a precipitate of silver

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forms in the solution and tends to deposit on the highlights and produce fog, so a fresh solution should be compounded for every batch of film treated. If one application of this treatment is not sufficient, it can be repeated a number of times.

REDUCTION

With reversal film, reduction is not nearly so effective as intensification, for while a reducer can—and will—lighten an over-dark film, it cannot produce detail which is not already in the film. Therefore, while one can get amazing results in intensifying over-exposed films, one can only expect good results from reducing films which have been mildly under-exposed. Like intensifiers, reducers can be classified in several groups, according to their action, but for use with reversal film, only one type—that known as a 'Super-proportional' reducing agent—appears to me to be satisfactory. Such a reducer attacks the heavier deposits of the shadows more powerfully than it does the highlights, and naturally lightens the dark places (revealing any hitherto unseen detail which may be in the film), while leaving the highlights relatively unaffected. Crabtree and Mueller recommend the following as an excellent super-proportional reducer:

Ammonium Persulfate Reducer (R-1) Stock Solution

Water	3 cc
Ammonium Persulfate	1 liter
Sulfuric Acid (conc.)	60 grams
Water to make	500 cc

For use, take one part of this stock solution and two parts of water, when reduction is complete, immerse the film in an acid fixing bath for a few minutes, wash and dry.

An excellent commercial ammonium persulfate reducer is the 'Tablod' solution, marketed by the Burroughs-Wellcome Co. This requires treatment of the film in a solution of sodium sulfite after reduction, and thereafter immersion in a regular acid hypo bath, and the inevitable wash and drying.

FORMALIN HARDENER

Before either reduction or intensification (especially the latter) it is advisable to treat the film for five minutes with the following hardening solution:

Formalin Hardener (SH-1)

Water	64 ozs
Commercial Formalin (40% I)	1 1/3 ozs
Sodium Carbonate (desiccated)	2.5 oz
Water to make	1 gallon

The films should then be rinsed and immersed in a fresh acid fixing-bath for five minutes and well washed to insure freedom from silver compounds and hypo

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Sensitometric Control in the Processing of Motion Picture Film

Continued from Page 88

is derived from the H and D curve, such as is shown in Fig. 4. That portion of the curve with which we are interested in the determination of latitude is the straight line portion. If from the limits of the straight line perpendiculars are dropped to the log exposure axis, a simple determination can then be made of the exposure value where each of these perpendiculars hit the axis. The ratio between the two exposure values thus determined gives a measure of the latitude. Quite a little consideration is given to the latitude of an emulsion in the processing of sound records on film

A thorough appreciation of the importance of latitude as it affects negative and positive picture has not been attained.

Fog

Fog is an important constant in that it gives definite information regarding the final results of the developed photographic images. Fog may be considered as an actual density which has arisen from sources other than intentional exposure to light. It may be considered under two general headings, inherent fog and development fog. Inherent fog may be the result of certain of the silver grains being made developable by the chemical processes involved during the manufacture of the emulsion. It may also be due to slight exposure to light during some stage of the handling, either

prior or subsequent to its final and intentional exposure.

Development fog arises from such various causes as the action of fogging agents or reaction products in the developer, aerial oxidation, etc. Fog is not detectable until after development. From a purely practical standpoint no particular attention is paid to fog unless it gets outside of accustomed grounds. For example, in the development of positive film a fog value of .03 to .05 is quite normal and unless fog builds up beyond this limit it is disregarded, other than to record it. However, excess fog, which is readily detectable visually, plays a detrimental part in both picture and sound quality. Precaution is continually exercised to prevent fog of either the inherent or the development type.



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What Is F2 F3.5 F4 F5.6?

Continued from Page 124

stop setting. But that is getting away from the subject of what a definite stop actually means and there is one thing more that is very important, in the meaning of a definite stop, namely, a change in the character of the image with the change of stop.

In any lens there is always a definite increase in depth of focus as the lens is stopped down, and therefore always has a definite meaning as to the quality of the picture, that is to say, an F8 picture always has a greater depth than an F2 picture, regardless of the lens used.

The reason for this is very simple. The Fig. 2 shows a simple 4-inch lens working at F2 wide open, the solid wide angle illustrates the lens focusing two peripheral rays of light on the film plane and thereafter crossing the same angle at which they are coming from the lens. The two vertical solid lines that are drawn,

ANSWERS TO QUESTIONS ON HERE'S HOW PAGE

- 1—F2 gives 4 times as much exposure as F4.
- 2—Theoretically all lenses at the same stop, regardless of focal length give the same exposure.
- 3—A 4-inch lens gives a 6 times magnification over a 1 inch lens.
- 4—Panoramic in the direction of the action. That is panoramic with the action.
- 5—All cameras operate at a speed in the neighborhood of 1/125" inch varying with the shutter opening.
- 6—16 frames per second.
- 7—With a factor of four the closer opening is F4.5. You'll find the formula for figuring this on the story in this issue under the title 'What I Learned from a Professional'.
- 8—The proper stop would be F4. That is equivalent to a factor of 4. You have increased your speed 4 times.
- 9—A Red Filter will darken the sky.
- 10—There are 40 pictures on a foot of 16mm film.
- 11—About 4 minutes. There being 40 pictures to the foot and the speed being 16 pictures a second it is a matter of multiplying 40x16 and dividing by 60 second to arrive the minutes.
- 12—Overexposure makes a light picture.
- 13—The 16mm lens gives the largest field.
- 14—Use F16 the Supermagnification film being faster.



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one on each side of the focusing point form an arbitrary distance that will give a circle of confusion or blur one-eighth of an inch in size when the film is placed at either extreme position. Or, in other words, a lens working at F 2 would give a tolerance movement of one-half of an inch before creating a blur or circle of confusion greater than one-eighth of an inch. The second dotted line illustrates two central rays which should be the extreme rays if the lens were stopped down to F 4 and being at a much lower angle the tolerance movement is increased to one inch as shown by the two dotted vertical lines for an extreme movement of the film. Obviously, if there is a greater tolerance in the position of the film, there is the same tolerance when objects are at different distances because their crossing point will be closer or farther away than the focus setting. The other factors that enter into the definition are so much less in importance that they can never over-balance the angle condition.

What I Learned from a Professional

Continued from Page 103

this by his experience in Ceylon. While the light seems more intense down there, still the humidity filled the air with so much moisture that the light is filtered and it requires a larger opening than is used in California. However, he did give credence to the exposure meter by advising that if one is traveling the best thing they could carry with them to secure good results would be a good exposure meter.

The thing that interested me intensely was his talk on indoor lighting. From his remarks I gathered that it is the general practice of most professional cinematographers to work their lenses wide open on sets. They reduce the light in preference to closing down the lens, or they reduce their shutter aperture. The reason for this is that because of dramatic action it is important to have the audience concentrate on the principal characters, and for this reason the background is thrown out of focus. Also the wide open lens gives them a softer photography, especially for close-ups, as the lens, especially of the fast type working around F 2.0, will help to soften the photography because of the imperfections in these fast lenses due to spherical and chromatic aberrations.

I also learned that it is the habit of the professional to usually make close-up, even outdoors, at a larger opening than usual. That is, they may open up two or three stops beyond normal and if necessary use a neutral density filter in order to secure this softness. Also with the negative positive method additional control can be given to the nega-

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sive in the laboratory to further accentuate this softness.

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Super Photofloods for the Studio

Continued from Page 90

The increase in intensity should prove doubly valuable, for it is another step towards the cinematographer's ideal of gaining more natural effects through the use of lower lighting units. This increased intensity should, too, result in more pleasing light-balances. One has often heard the plaint of cinematographers, "Inkies are nice, but they don't carry." The light of a Super-photoflood should have a marked improvement in this characteristic. Even in the cursory tests thus far made with these new units, a marked increase in carrying power is noticeable: shadows are softer and more natural, while the high-lights still retain a desirable softness and definition.

For an understanding of these factors, we must again revert to the theoretical. The illustration shows comparative spectroscopic curves of the standard 1500-watt PS-52 bulb and the new Super-photoflood 2000-watt PS-52. It will at once be noticed that, aside from the generally higher efficiency of the new bulb, the characteristics of the two bulbs in the invisible infra-red region are markedly different. The present type gains in efficiency as it penetrates farther and farther into this zone, while the Photoflood's curve begins a pronounced downward swing shortly after passing from the visible red to the invisible infra-red. In other words, the major part of the energy applied to the Photoflood is returned in the form of visible, useful light instead of loss in the case with the standard lamp being wasted in the production of useless, invisible infra-red radiations.

This brings to light another advantage of the new globe—one which is especially marked when used for natural-color cinematography, of course, but notable in any case. It is well known that heat-rays and infra-red rays are, if not absolutely identical, very closely related, and that the farther one penetrates into the infra-red spectrum, the greater the amount of heat carried by the rays. The standard Mazda lamp, with its very considerable infra-red radiation, is, therefore, quite as much of a heat-machine as it is a light machine. The Photoflood, on the other hand, with its curtailed infra-red emanation will diffuse much less heat in proportion. One has, unfortunately, been as yet unable to make accurate measurements of this factor, but according to the General Electric engineers, and others, this should be in the neighborhood of one-half to one-third less than the heat-radiation of a comparable standard Mazda lamp. This means in practical terms, that everyone on the set—especially the actors, of course—will be able to do their work better, with less fatigue, longer hours, when necessary, will be less tiring, and

a normal working-day will produce better work from everyone, without leaving so great a tax on the physical and nervous energy of the personnel on the set.

When considered for their application to natural-color cinematography—and with the announcement of Technicolor's three-color process, there is anticipated a definite increase in color-production—the Super photoflood is doubly useful. Its greater overall intensity at once simplifies the problem of lighting for color; moreover, its increased blue-violet radiation is particularly adapted to the needs of all color-cinematographic processes. Its closer approximation of natural light simplifies the problems of the technicolorist, as it makes it possible to use the same camera successively on interiors and exteriors without alteration of the delicate beam-splitter filter-unit. And its greatly reduced heat-radiation will undoubtedly prove a blessing to the actors and others working on color sets, where the increased illumination hitherto demanded has brought with it super-tropical temperatures.

Automatic Speed Control Motor

Continued from Page 91

two sets in multiple will give service for 40 to 60 thousand feet or more. Since the automatic control unit is a power change device the running down of the batteries has no effect on the speed of the motor and the voltage may drop as low as 110 volts before affecting the speed.

Thus you can see it will handle a voltage change of from 20 to 30 volts successfully.

The simplicity of operation is an outstanding feature in the use of this motor system. Once the necessary preliminary adjustments have been made all that the operator has to do is to throw on the switches and the entire unit is ready to work in about three seconds. Waste starting footage is cut to a minimum.

Because of the rather complicated necessary equipment which is included in the switching base, and because of the many tests to be made before releasing the motor to a customer, the latter is never sold separately but only completely mounted, wired, and tested on the recorder base.

Milner on Vacation

●Victor Milner, A.S.C., having completed Paramount's "Song of Songs," starring Marlene Dietrich, under the direction of Rouben Mamoulian, has been enjoying a well-earned vacation. His next assignment is reported to be Ernst Lubitch's production of Noel Coward's play, "Design for Living."

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Riddle Me This

Continued from Page 94

visual sequence of this nature is a story in itself, it follows that the technique of filming each sequence will be different. Such sequences are, to my mind, rather like individual solos in an orchestral composition when considered in relation to both the picture as a whole and to their individual parts. I believe that the camera's function in such instances should be analogous to that of the conductor's baton in conducting a symphony, not that the camera should be constantly on the move (although moving-shots have their definite place, as in every sequence), but the camera should serve to co-ordinate the individual scenes with each other, and the sequence with the production as a whole. In ballets especially (though it is hardly less so in musical interludes) a thorough understanding of the visual values of the cinema is vital: a misplaced traveling-shot, close-up, or long-shot, lack of understanding of rhythm, or lighting, will ruin the best-planned action."

SALVATORE POLITO, A.S.C., photographer of "42nd Street," "Gold-Diggers of 1933," etc.

In the production of the filmed musical-comedies and revues, such as we have been making lately, the function of the camera can be compared to a pair of opera glasses in the hands of a member of a theatre-audience properly used; they bring the spectator close to any interesting or important bits of business, allow one to admire the perfection of form of the dancers, members of the chorus, etc., and are laid aside when spectacular or beautiful stage-pictures are to be viewed en masse. In my last two pictures, I have found that if close co-operation and understanding exists between the director and the cinematographer, the work of both is at once lightened and improved. Such a director as Busby Berkeley, for instance, realizes the importance of this, therefore, we work together in the closest co-operation. After rehearsing any number several times as a whole, we find that it is easy to break it down into its individual components. Then we prepare a special continuity, in which the thing is considered from the cinematic viewpoint—as apart from either the dramatic, the musical, the choreographic, or the purely photographic for the desired result must be a perfect combination of all four. Considered in this light, it is easy to separate the routine into its components—stage-pictures and individual business. Once this is done, the cinematic technique dictates itself, just as does the technique of an ordinary dramatic sequence. We know that certain things must be brought close to the spectator, that other things are more effective when viewed at a dis-

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stance, as a pictorial long-shot, and that some action will be benefited by moving-camera treatment, while other action would be killed by such treatment. The greatest skill, of course, is required in introducing and concluding such interludes—joining them to the major plot of the picture, so that they are not just interludes, or extraneous embellishments, but active parts of the story. This can

be quite as much a problem to the cinematographer as it is to the director, ballet-master, and the rest. The space here is far too limited to detail the examples of this technique as they should be described, but the two productions I have recently made with Mr. Berkeley should serve as excellent examples of what can be achieved—regardless of the material at hand—by such co-operation."

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Special Effect Use of Filters Part II

Continued from Page 91

amount of red and green, each one step-
ping blue will stop the blue entirely—
therefore we need not lose as much ex-
posure in the foreground as would seem
at first blush in order to reduce the sky
to the common gray of the foreground
that we want.

Another situation is a blue sky and
green trees, shrubs, grass, etc., with gray
sidewalk, etc., the blue sky having the
greatest illumination. Applying our rule
again, we would use a green filter to
decrease the sky exposure and allow all
of the green to pass through the filter
and obtain the least contrast possible
between the blue and the green by re-
ducing all of the light to green. The
use of green filters for flat night and gray
down scenes is very effective because
there is usually a predominance of green
foliage to be had, also if there are people
in the scene the green holds back the
red in the faces and gives a darker
gray gray appearance that is very natural
for that kind of scene.

The examples of filter applications and
combinations are unlimited, but the three
illustrations should serve as a guide to
practically every situation there is in
making flat scenes. However, we did not
mention making contrasty moonlight
scenes, so we will use our first illustration
of the blue sky white clouds, white
house, etc. If we use a red-yellow filter
of very red and less green combination
we will get the greatest exposure from
our whites that can be had, because we
are getting most of the red and some
green from our white, and we will turn
our blue sky black, giving extreme con-
trast instead of the flatness we obtained
with the blue filter on the same scene.
Also, if there are people in the scene
light from the faces will pass through
the filter about the same as light from
the white house, so that they will have
the contrasty white faces which have
been so apparent in many of our moon-
light scenes.

Wheels of Industry

Continued from Page 90

starting from clear to the density desired
by the Cinematographer. They overlap
each other, coming in from opposite sides,
and by means of a screw and rack they
are worked so as to bring the deeper
density in from each side and overlap
each other. This eliminates the diffu-
sion coming in from one side which has
been the case up until now and has been
very obvious on the screen. This new
method brings the diffusion in from both
sides at the same time. This type of
holder has been in demand among the
studio cameramen for a long time, espe-

cially for daily shots. The adapter was de-
signed by Joseph Walker, A.S.C. George
Scheibe manufactures the filters for this
new holder.

Fototshop Editor

● In our report last month on the re-
wind being marketed by the Fototshop of
New York City, we failed to mention that
this device is also an editor, as well as a
splicer.

New Victor 5 Speed Model

● Announcement from Victor Anima-
tograph Company described a new 5-
speed 16 mm. camera to sell at \$67.50.
This is finished in gold-flecked lava
brown with chrome trim and equipped
with the Triple Anammat Dallmeyer
F.2.9 fixed focus lens. The camera is
known as their new 5-Speed Model 3.

Filming the National Air Races

Continued from Page 102

rating planes will be flying so fast they'll
be hard to follow, they will make four
runs in opposite directions over the mea-
sured one-kilometer straightaway course,
diving to gain speed, and passing in front
of the stands, about 50 or 100 feet in the
air at speeds of about 300 miles per hour.
Try the one-inch lens on the first run,
and the two-inch on the successive ones
if you find it feasible. Filtering will de-
pend on the coloring of the planes used.
After this, the fortunate and fair lady-
pilot will probably be called "front cen-
ter" to the judges' stand, where you can
get some nice close-ups with the 2-inch
or 3-inch. The next important event will
probably be the arrival of the Bendix Tro-
phy racers from New York. The winner
probably having made the hop in less than
ten hours! , another job for the 2-
inch. The try for a world's delayed-
opening parachute jump, in which the
junior will try to fall four or five miles
before opening his chute, will probably
be poor picture material, so take it or
leave it, as you wish. I'd leave it.

"SECOND DAY." Here you can be-
gin to shoot the regular events—the less-
er races for commercial pilots, the stunts,
and the military displays. The stunting
will take place at altitudes ranging from
ground up to 3,000 feet, with most of
it under 200 feet. Capt. Udet, the Ger-
man Ace of Aces (remember his flying in
"Pa Pa?") specializes in extremely low
stunting. The French stunter who
flew last year specialized in stunting too
close to the stands. The Polish and Ital-
ian representatives specialize in precision
flying. And the price de resistance is
Flight Lieutenant R. L. R. Atcherley's
"Crazy Flying" the Englishman is for-
mer holder of the world's speed record
can do more hair-raising evolutions with-
out leaving the ground than anyone would
dream could be done, even by an addi-

ated student-pilot. His "turn" often includes playing tag with a motorcycle police-officer, climaxed by running the representative of the law ignominiously off the field. All of these stunt-exhibitions call for a judicious admixture of the 1-inch and 2-inch lenses, with the two predominating. And don't forget closeups of the European ace! The next major event is the Cleveland Aerial Trophy speed race for women—excellent practice for the still faster Thompson Trophy race for men, and far better than 250 m.p.h. is a thriller in its own right. It's a job for the 2-inch lens and filters—and don't forget the closeups of the ladies!

"THIRD DAY" This will be a good day to concentrate on the Army and Navy "shows." Mostly two-inch lens work, with some for the three. Heavy filters for the smoke-screens and bombing, with the exposure held well down. This will also probably be movie day, when you can shoot Hal Mohr and Wally Beery chasing each other around the race-course. Don't forget the closeups, even if Hal isn't quite so decorative as May Hazlip or Louise Thaden!

"FOURTH DAY"—being July fourth, this will be featured by a number of special events, not as yet definitely announced, and by the super-speed classic, the Thompson Trophy race. By this time, you should have your hand well in at filming high-speed racing, and have seen enough of your previous work to know exactly how to handle your camera to get the best possible pictures of 300 m.p.h. racing. This will also be a day to fill up your other sequences with individual shots of planes and pilots, and to make those "added scenes" and "retakes" that every good picture needs. There will also be some chance for this the following day, after the show has closed, for many of the contestants will still be at the field—and the crowds will be smaller, with most of the restrictions removed. And by this time, you will, from experience, be able to pass on to the other fellow the advice: "Don't use too long-focused lenses. Don't forget your tripod, and never think you've got enough closeups!"

Killing the Process Hot Spot

• Ingenious methods for obtaining results have made history in the development of Cinematography. With the popular use of Process Photography one of the principal bugaboos has been the hot spot on the screen. Several ingenious cinematographers have overcome this by various methods. However, the most popular seems to be either the use of an opaque pencil, which is used for covering the center of the glass in front of the projector to about the size of a half-dollar, making the center heavy and gradually bleeding off. The other is the use of a filter in front of this glass, with the center dark and gradually lightening toward the outskirts.

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Len Roos Gets Royal Appointment

● Len H. Roos, A.S.C., FRPS, now in Java making "Nature in the Raw" for Universal, reports that he has been honored with a Royal appointment from the Soesoe Honan of Soerakarta. He writes:

"Through the good graces of some friends in Java, I was invited to photograph the ceremonies relating to the marriage of three of the Royal Household of the Soesoe Honan of Soerakarta (who is the Sultan or King of the Javanese). For splendor I have never seen anything to touch it, and Universal should appreciate these, the first pictures ever made in the palace. The dances and costumes were beyond anything I have ever seen, and the gold displayed was amazing. I got the whole works in sound, and the completed picture should be very interesting. To top it off, I have received a Royal

Appointment from the Soesoe Honan as Cinematographer to his Royal Highness. I am informed that a decoration is to follow. The appointment is the Royal Coat of Arms in colors (many) together with a letter in Javanese.

Commercial Studio Employs Silent DeBrie Camera

● One of the first of the silent Super Parvo DeBrie cameras to be delivered in this country was received by the Jam Handy Picture Service, Inc., of Detroit, Michigan.

After using this camera in the studio, John Sinclair of that corporation reported as follows to the New York office of the Andre DeBrie corporation:

"We operated the camera recording with microphone as close as 18 inches from the camera in a very live set and were unable to hear any camera noise. Our recording equipment is Western Electric Noiseless and is in first class condition."

Lights Discussed at S.M.P.E. Meeting

● At the June meeting of the SMPE held in the Bell & Howell auditorium, Hollywood, under the chairmanship of Emory Huse, A.S.C., the latest development in studio lighting was demonstrated. Among those addressing the gathering were Elmer C. Richardson, of Mole Richardson, who demonstrated and explained the new development in arcs for the use in making three-color pictures.

R. M. Maxwell, of the Electrical Products Corporation, described a development of his company known as the Lumenarc, a gaseous tube unit for daylight quality.

Ralph E. Farham, of the Mazda Lamp Division of the General Electric Company, described a new development in incandescent lamps for motion picture lighting.

John Boyle, A.S.C., in New York

● John W. Boyle, Past President of the American Society of Cinematographers, is in New York concluding distribution arrangements for a series of Multicolor short-subjects he recently produced.

Carbon Reduced in Size for Higher Intensity

● Interest is keen in Hollywood in the recent carbon development for studio lighting made by the National Carbon Co.

Primarily designed for the use of three-color process, as is employed by the Technicolor Company, these carbons were developed with a new type of core material, reducing the diameter from 1/2-inch to 5 mm., and then applying a copper coating. It is claimed this carbon carries as much current as the half-inch carbon carried, but gives a 40% increase in illumination.

Mole-Richardson is developing the lamp house and the first twenty-five are being delivered soon to the Technicolor Company for final tests under actual studio conditions.

Karl Freund, A.S.C., to New York

● Karl Freund, A.S.C., has been assigned to the direction of Universal's musical production, "Moonlight and Peaches" (originally "Shoot the Works"), which is now in production at Astoria, L. I. This film—Cinematographer: Freund's second American directorial assignment—stars Mary Brian and Leo Carrillo, and is being supervised by Stanley Bergerman.

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Lebanon, Photographic Co.
Nashport, K. E. Walden, 1 A Main St.

NEW JERSEY

Allentown, City, Eastman Kodak Stores, Inc.,
1732 Broadway.

Belmont, Milton Mendelsohn, 192 Ave. B
Cliffside Park, Louis C. Chisnap, 639 Anderson
Ave.

East Orange, Edmund J. Fawcett Jr., 45 N. 16th
St.

Hawthorne, Hawthorne Home Movie Service,
52 Madison Ave.

Inglehart, Wool Bros., 1340 Springfield Ave.
Jersey City, Levy's Sport Shop, 149 Montello
Ave.

Mahwah, Edward Madison Co., 42 Bloomfield
Ave.

Newark, Annapolis Bn., 318 Broad St.
Paterson, Robt. G. Smith, 40 Hamilton St.

Salem, Drug Store, 170 Market St.
Summit, Eastman Kodak Stores, Inc., 830 Springfield
Ave.

Trenton, Howard E. Thompson, 25 Newark
Ave.

Union City, Herco Exchange, Inc., 611 Ber-
kshire Ave.

West New York, Rembrandt Studios, Inc.,
526A Bergenline Ave.

NEW MEXICO

Santa Fe, Capital Pharmacy, Inc.

NEW YORK

Albany, Albany Photo Supply Co., Inc., 204
Washington Ave.

Binghamton, A. S. Bump Co., Inc., 160 Wash-
ington St.

Brocklyn, Geo. J. McCadden, Inc., 202 Bri-
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When to Use Special Effects —And How

Continued from Page 100

piece, shooting one frame at a time, and when the puzzle is all together, getting eight or ten frames of it completed. If you've done it properly, you'll have your pie-saw puzzle assembling itself as the previous shot fades slowly out. It might be a good idea to have the first twenty or thirty frames of the puzzle fade in quickly! Now, when this second roll has been processed, splice it onto the scene from which your puzzle-enlargement was made, taking pains to make a very good splice—and when you project the film you'll see the first shot fade out while the second laps quickly in as a pie-saw puzzle assembling itself, when the assembly is complete, the action will go on with only a very small jump. The trick of this, of course, is to co-ordinate your fade-out with the footage required for assembling the puzzle, this may require you to assemble the puzzle quickly, bringing in two or three pieces (or even more) in every frame. Properly done, however, it's the sort of a shot that will make your friends rub their eyes and ask, "How in Sam Hill did you do that?" Incidentally, you can use this same general idea for a lot of trick transitions such as whips, page-turning, zippers, and the like. Try it!

That disposes of the "How" of the subject, but what about the "When" and "Why?" Well, if you want a slow transition between one scene and the next—for instance, where the element of time or distance between the two is considerable—use a simple fade-out followed by a fade-in. If, on the other hand, you want a smooth, quicker transition between two rather closely related scenes, locations or ideas, use a lap-dissolve. If you want a quick, abrupt transition, simply cut from one to the other. Wipes, trick-transitions, and the like, should be treated as cook treats pungent spices, use them sparingly, and only for a pronounced effect. A wipe, for instance, is midway between a lap and a cut—smooth, but noticeable. To sum the matter up, then, where you want your transitions noticeable, use either the slow fadeout-plus-fadein, the abrupt cut, or an eye-arresting wipe or trick, where you want them unobtrusive, use a lap-dissolve.

Treatise on Visual Fatigue

• The Amusement Age Publishing Company have issued a booklet titled "The Visual Fatigue of Motion Pictures." This is a compilation of opinions of various people in the industry and of other data published on this widely discussed subject. The booklet also delves into other phases of theatre audiences in the discussion of ventilation, seating posture, etc.

1933 Amateur Competition

will be judged by the American Society of Cinematographers. . . . Each entrant will be given a personal review of his picture by a member of the Society.

There will be a dozen or more classifications under which the pictures will be judged.

Those given recognition for first place in the various classifications will be given a Gold Medallion. The greatest honor any Amateur Can Achieve.

Pictures must be in the offices of the American Cinematographer not later than October 31st.

One of the 1932 Prize Winners is now being shown at the Century of Progress, Chicago. It is acknowledged by school authorities as one of the outstanding subjects for Primary Grades and is being placed in School Libraries.

Write for Full Details to

**THE AMERICAN
CINEMATOGRAHER**
6331 Hollywood Blvd.,
Hollywood, Calif.

Directory of Dealers

Continued from Page 120

Pullman Graham Studio
Seattle: Anderson Supply Co., 411 Cherry St.
Eastman Kodak Stores, Inc., 1415 - 4th Ave.
Lawrence & Harland Co., 1514 - 1st Ave.
Spokane: John W. Graham & Co., Dept. C, 707
Sprague Ave.
Tanner Drug Co., Howard & Riverside Ave.
Tacoma: Eastman Kodak Stores, Inc., 910
Broadway
Walla Walla: Book Nook Drug & Stationery
Store

WEST VIRGINIA

Wheeling: Twelfth St. Garage, 81 - 12th St.

WISCONSIN

Fond du Lac: Huber Bros., 36 S. Main St.
La Crosse: Main Photo Service, 313 Main St.
Madison: Playburt Hayes, 212 State St.
Milwaukee: Eastman Kodak Stores, Inc., 737
N. Milwaukee St.
Boston: Boston, Wisconsin Ave. & 4th St.
W. E. Brown, 121 W. National Ave.
Gribble Bros., E. Wisconsin & N. Parkington
Roa Meier, The, 225 West Wells St.
Phillips: Johnson's, 112 N. Lake Ave.
Racine: Photo-Crafts Shop, 520 College Ave.

AUSTRALIA

Melbourne: McGuin Agency, 179-218 Elizabeth St.

CHINA

Canter: International Book Co., 268 North
Wing Hon Road

ENGLAND

London: J. H. Gilmeyer Ltd., 31 Mortimer
St. and Oxford St. W. 1

HAWAII

Honolulu: Eastman Kodak Stores, 1059 Fort
St.

INDIA

Bombay: Continental Photo Stores, 255 Hornby
Road
P. C. Erane Sans Albert Bldgs, Hornby
Road

COUNTRIES

Courtesy: Photographic Stores & Agency Co.,
134 Dharmadatta St.
M. L. Shaw, 5/1 Dharmadatta St.
Lucknow: Lucknow Commercial Co., 25 Amma-
bad Park

MEXICO

American Photo Supply Co. S.A., Av. F. I.
Madero 42, Mexico DF

POLAND

Warsaw: Polska Agencja Prasy Fotograficznej
Warszawa 35

SOUTH AMERICA

Buenos Aires: Argentina Rep. Casa America
Lda. S. A. Avenida de Mayo 959

Hollywood Develops "Photo Row"

What is coming to be dubbed "Photo-Row" in Hollywood is the four square blocks which include Hollywood Blvd., Sunset Blvd., Culverga Blvd. and Vine St.

This section within the next month will house six photographic dealers. The Hollywood Camera Exchange, the pioneer in this section is located on Culverga and Selma. Within the last month Educational Projects-Film Company opened new quarters almost directly across the street from the Camera Exchange. Faxon Dean will open his establishment sometime this month in the next block.

On Sunset, Gilbert Morgan conducts the Morgan Camera Shop. On Vine St. Park Rees is putting the finishing touches to his new store and completing the circle is the Hollywood Citizen store on Hollywood Blvd.

Classified Advertising

Rates: Four cents a word. Minimum charge, one dollar per insertion.

FOR RENT—MISCELLANEOUS

FOR RENT—Mitchell Motor 25 M.M. Lenses 1000 feet Mitchell Magazine, Baby Tripod 1 & Lockwood. Glendale. Phone Douglas 3501 W.

FOR RENT—Mitchell high speed gear box complete. Pony Home 1316 N. Stanley HO 7882 or HO 9431

• You Want The Cinematographer Annual

FOR SALE OR RENT

FOR SALE OR RENT—Mitchell and Bell & Howell standard cameras, follow focus Pan lenses, free head, second new aperture. Akelar, Debra, Parha, Universal, Prevor, Whittier, Corry, Syma, East Leica, Mottis. Renters lighting equipment. Also every variety of 16mm and still cameras and projectors. Everything photographic bought, sold, rented and repaired. Send for our catalog catalogue. Open 9 A.M. to 10 P.M. Hollywood Camera Exchange, 1600 Culverga Blvd. Phone HO 3051. Cable address: HOCAMEX.

FOR RENT—CAMERAS

FOR RENT—Thoroughly serviced Mitchell cameras, Pan Auto lenses, follow focus. J. R. Lockwood. Glendale. Douglas 3501-W.

FOR RENT—Mitchell high speed camera with 40-50 and 75 mm. Pan Auto lenses. 1000 ft. magazines, follow head, tripod. Pony Home 1316 N. Stanley HO 7882 or HO 9431.

FOR SALE—CAMERAS

AKILEY CAMERA—Practically new rebuilt for color films and 35mm lenses. 13 magazines, case, tripod etc. Cost \$3,000—will sell for \$1,250. Box R.W.S. care American Cinematographer.

FOR SALE—35 M.M. Pathé Studio Camera. F. F. 3.5. Krasno. Model carrying case. Three magazines. \$100. Universal Tripod with carrying case \$75. Box 5. American Cinematographer. 1222 Guaranty Bldg. Hollywood.

FOR SALE—Bell & Howell adapter for Mitchell Tripod head. 40-50 TS M.M. Auto lenses mounted and unmounted. Mitchell tripod head. Mitchell motor box. J. R. Lockwood. 522 N. Grand St., Glendale. Calif. Douglas 3501 W.

FOR SALE—Bell & Howell Standard Aperture Camera with Mitchell standard pan and tilt tripod 4"-400 ft. magazines. 2. Bayler P. 2. Carl Zeiss P. 2.1 and 3. Carl Zeiss Hyper P. 3.1 lenses. Lens Shade and Filter Holder. Vendor counter. Address Box E 145 American Cinematographer. 8331 Hollywood Blvd. Hollywood. Calif.

An Important Warning

• The Board of Governors of the American Society of Cinematographers recently received the following communication from an American cameraman working in South America:

"I consider it my duty to warn all cinematographers of the following: There will be quite a few offers, full of glowing promises, from South American would-be producers (especially in the Argentine) to cinematographers. I must warn my fellow-cinematographers to be very careful in even considering such of-

FOR SALE—Avalon Camera No. 256 with case tripod and case. Case requires 3 extra magazine. I can match Zeiss lenses. 3 film photo lenses, view motion attachment, view filters, masks, accessories and more. Frank New send/receive used for only about \$300. New 16mm lens. Price \$3400. Sale price \$1500. Glendale Camera Stores, Inc. 117 Park Ave. New York City.

You want The Cinematographer Annual •

FOR SALE—MISCELLANEOUS

FOR SALE—16" Minox—semi-portable 35 M.M. projector complete with carrying case and extra carbon. Box 5 care American Cinematographer.

FOR SALE—Special complete 16 mm. editor with geared handcrank, Rheoformer and editor \$4.50 plus postage. Money refunded if not satisfactory. ROTO SHOP, 136 West 32nd St., New York City.

FOR SALE—New Kodak Model A, new condenser, electric motor \$35.00, also 3A Kodak Special excellent condition, \$35.00. Write for details W. L. McAlexander, 615 South 62nd Street, Birmingham, Alabama.

544 pages of valuable information •

WANTED

SHOPGUNS Target Pistol Rifles and other good firearms may be traded in at liberal allowances on any photographic equipment movie or still, including Bell & Howell Eyeball and Helios, Eastman Victor Leica Zeiss Ikon Warner and other leading makes. NATIONAL CAMERA EXCHANGE, 5 South 5th St., Minneapolis, Minn.

WANTED—Seal Camera must be responsible. Address Box V150 American Cinematographer 6137 Hollywood Blvd. Hollywood. Calif.

WANTED—Delvey 35mm Hand camera double claw movement. Must be cheap and in good condition. Box 6 care American Cinematographer.

WANTED—Victor enlarger. J. R. Lockwood. Glendale. Douglas 3501-W.

**WANTED—Mitchell High Speed 35mm Camera box only without equipment. Must be cheap for cash. Box 140 American Cinema-
tegrapher.**

SITUATION WANTED—Motion Picture Engineer employed desires executive position, preferably sales-engineering. Recent training. Experienced cinematographer. Professional cinematography special representative. Excellent references. Box 26 American Cinematographer.

WANTED—Zeiss enlarger must be in good condition and cheap. Box H.R. care American Cinematographer.

fers for doing here not even contracts mean anything. The only thing to do is to have the contract endorsed by some good American bank, and then to be sure that one's passage both ways is paid in advance.

If you don't take these precautions, well, it is just too bad. This is the advice of an American cinematographer who lived before he looked—and paid his way through.

"The local market is so limited that the production-cost of a picture 'Made in Argentina' is seldom more than what would be paid the First Cameraman alone in Hollywood for making one film.

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